

PUBLIC WORKS

Nov.
1953

CITY, COUNTY AND STATE

Automatic Signals for
a Difficult Intersection

Report on the Present
Status of Rainmaking

Water and Sewage
Chemistry & Chemicals

Pay-As-You-Go Paving
Project Operation

Industrial Waste Plant
Treats Domestic Sewage

Chicago's Economical
Sanitary Landfill

How to Get Public
Employee Safety



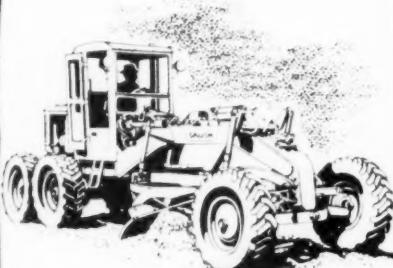
William A. Bowes, Com'r. of Public Works of Portland, Ore., since 1939, has sponsored street, sewerage, planning and zoning projects. See page 24.

GALION WAS FIRST!

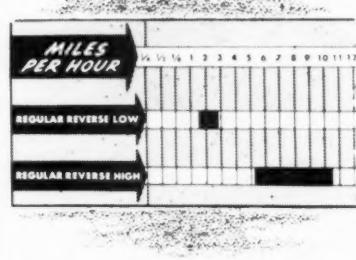
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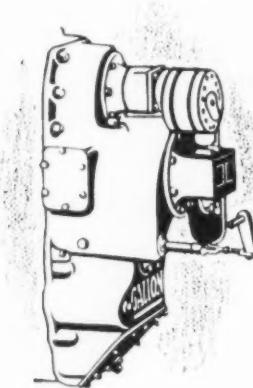
2. TO GIVE YOU SAME SIZE (LARGE) TIRES, FRONT AND REAR - for best flotation and more axle clearance.



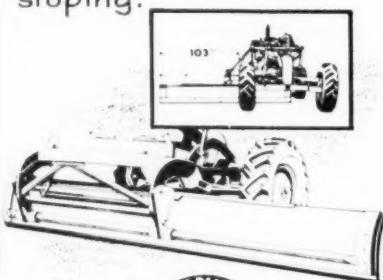
3. TO SUPPLY A HIGH SPEED REVERSE GEAR --- you can accomplish more work.



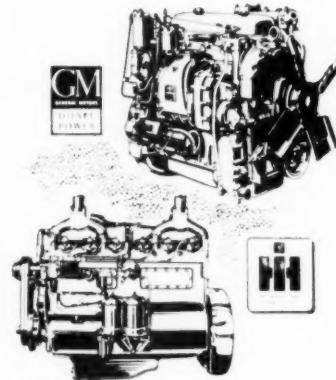
4. TO MAKE AVAILABLE A "CREEPER" TRANSMISSION -- for work requiring extremely low speeds -- to 1/3 M.P.H.



5. TO BUILD HYDRAULIC SHIFTABLE MOLDOBOARDS ON TANDEM DRIVE MOTOR GRADERS - operated from platform -- increases reach for grading, maintaining and bank sloping.



TO OFFER YOU A CHOICE OF TWO MAKES OF DIESEL ENGINES (IHC or GM) - permits standardization of parts and service.



THE GALION IRON WORKS & MFG. COMPANY
GALION, OHIO, U.S.A.

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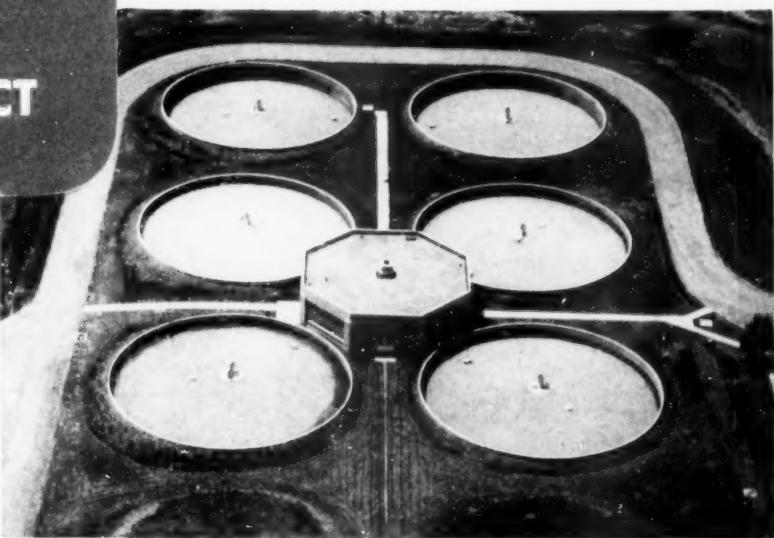
MANUFACTURERS OF
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**ACCELERATED
SLUDGE
DIGESTION
NOW A FACT**

CRP

**CATALYTIC
REDUCTION
PROCESS**

*Exclusively through the
Catalytic Reduction Process**



The Catalytic Reduction Process completes biological sludge digestion in one-third to one-fourth of digester volume generally required. The Process accomplishes this by digesting at solids loading rates three to four times those being practiced. This accelerated digestion is simple and economical, using only the natural products of anaerobic decomposition.

Originating in 1946, the Process was developed, tested and verified over six years on both laboratory and pilot plant scale. The results obtained in the pilot plant operation have been proven in full scale plant operation at the Columbus, Ohio Sewage Treatment Works in 1952 and 1953.

The Catalytic Reduction Process applied to one 70' tank at the Columbus Plant digested 3.38 times the quantity of sludge solids digested in a similar tank in parallel operation not using the Process. The tank operated under the Process produced a reduction of solids within established ranges, normal gas production and readily drible odoreless sludge.

The Catalytic Reduction Process is now available for consideration by consulting engineers for application on plants under design and for plants requiring expansion. The Process when applied to overloaded digesters will provide sufficient capacity without additional tanks.

*The only proven Process for accelerating biological digestion. (Patents applied for.)

The Catalytic Reduction Process is offered through the Catalytic Reduction Co., Inc. a subsidiary of the Chicago Pump Company.

Now's the time to mail this month's Reader's Service card.

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SEWAGE EQUIPMENT DIVISION

622 DIVERSEY PARKWAY
Flush Kleen, Scro' Peller, Plunger
Horizontal and Vertical Non-Clog
Water Seal Pumping Units, Samplers



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Swing Diffusers, Stationary Diffusers,
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Mr. Hickok's HT4 Shovel loading chert from the county's own pit. The shovel's 80-inch wide, 1 1/4-yd. bucket is wider than the tractor itself, providing a smooth maneuvering surface.

"...NO equipment serves or wears like CAT* equipment"

That's *experience* talking! County Superintendent Stacy Hickok of Lawrenceburg, Tenn., who makes the statement, has been building and maintaining roads for 28 years!

Right now he's building 11 miles of gravel road and maintaining approximately 3,000 miles more, with the help of the Cat HT4 Shovel you see above, a Cat No. 12 Motor Grader and a Cat D7 Tractor.

Caterpillar Shovels are world-famous for strength, toughness and durability. Operators like them because of the non-oscillating track frame which gives greater stability . . . the automatic tip-back which keeps the bucket full at all times . . . the positive, clean dumping of even the stickiest materials . . . and the shovel's ability to raise and dump at the same time. Visibility is excellent—Cat Shovels can work in low-overhead areas and

get in and out of tight places easily. Controls are conveniently placed.

Your dealer can provide fast, efficient service with his staff of highly skilled mechanics and complete supply of genuine Caterpillar parts. Call him for an on-the-job demonstration.

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CONTENTS FOR NOVEMBER, 1953

The Present Status of Rainmaking. By T. H. Evans	53	Elements of Water and Sewage Chemistry and Chemicals	78
Automatic Signal Will Pay for Itself in Three Years	54	Building and Stabilizing An Access Road. By G. E. Martin	90
How to Get Public Employee Safety. By Wendell R. LaDue	56	Disposal of Tannery Wastes. By W. H. Taylor	94
Chicago's Economical Sanitary Fill. By E. J. Knudsen	58	How a Central Equipment Agency Can Perform. By H. R. Richardson	96
Sewage Treatment Meets "Amazing Growth" Problem	59	Texas Water Works Operators' Training	98
Financing Connecticut's Town Highway System	61		
Trash - The Big Headache. By T. E. Goodrow	63		
Protecting a Water Main Under a Bridge. By P. C. Karalekas	65		
Radar Checks Motor Vehicle Speed	66		
Erosion Control on Highway Slopes	67		
A Suggested Solution of Texas' Water Problem	69		
Diesel-Driven Pumps Reduce Drainage District Costs. By William H. Klinger and M. B. Carroll, Jr.	70		
Pay-As-You-Go Paving Project. By B. H. Cruce	71		
Industrial Waste Plant Treats Domestic Sewage	73		
Pavement Rehabilitation in Oregon. By Ray Webber	74		
The Weather Consultant - What He Can Do for You. By John R. Murray and Dennis W. Treffel	76		
How Denver Controls Out-Of-City Sewerage Connections	77		

PUBLIC WORKS DIGESTS

The Sewerage and Refuse Digest	103
The Highway and Airport Digest	110
The Water Works Digest	117

DEPARTMENTS AND SECTIONS

The Editor's Page	7	Lighting & Traffic Control	80
Leo Ritter	18	APWA News	83
"Doc" Symons	22	Washington News	88
Leaders in Public Works	24	Books in Brief	98
Letters to The Editor	26	New Public Works Equipment 127	
P W Engineering Notes	30	Worth Seeing	133
The Engineers' Library	36	Worth Telling. By A. K. Akers 134	



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... Another Street with Natural Rubber

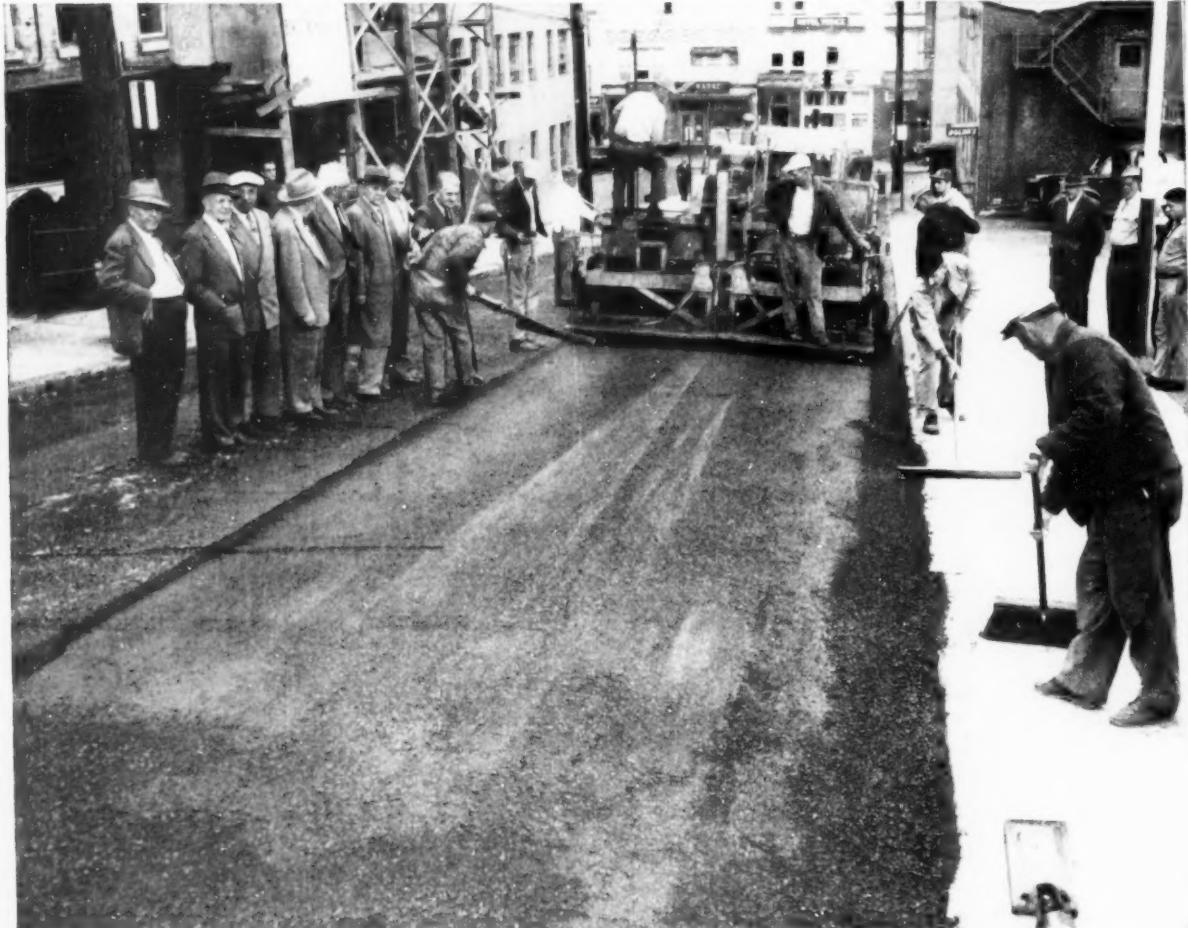
From Seattle to Miami, from Los Angeles to Newfoundland, more and more stretches of natural rubber pavement are being laid by city engineers.

Natural rubber roads are today's fastest growing and most promising new highway development. Engineers everywhere are putting down test strips, because laboratory and in-place studies indicate that natural rubber roads will last longer, require less maintenance, and aid greatly in stretch-

PUBLIC WORKS for November, 1953

ing their burdened highway budgets.

You can get complete information about laying a test strip of natural rubber-asphalt road from the Natural Rubber Bureau in Washington, D. C. This Bureau not only maintains the most complete laboratory for testing rubber-in-asphalt mixes but also has available a staff of trained field engineers to assist you in planning and installing test strips of natural rubber roads.



An array of interested officials look on as Pottsville becomes the first town in Pennsylvania to pave a block with natural rubber-asphalt mix. The experimental stretch was put down in September, under the guidance of Natural Rubber Bureau highway engineers.



Natural Rubber Bureau

1631 K Street, N. W., Washington 6, D. C.

Natural Rubber Bureau Research Laboratory, Rosslyn, Virginia

Get full details of this month's products... mail your Readers' Service card today.

If you want help in laying a stretch of natural rubber road, or further information, write today.

The Editor's

POINT OF VIEW



Our American Highway Industry—A Great Economic Activity

ACCORDING to the Brookings Institution, highway transportation as we know it in the United States is "the greatest single combination of economic activities in man's history." It pays one-sixth of the nation's taxes, and provides over ten million jobs. Six million workers, for instance, are truck drivers. More people are employed in all branches of highway transportation than on all the nation's farms. Individual business establishments directly connected with highway transportation number over 700,000. The people of the United States pay over \$50 billions a year for highway transportation services. Motor trucks account for 15 percent of freight ton-miles and 77 percent of total freight tonnage hauled yearly. Highway transportation also accounts for 95 percent of all passenger miles of travel in the United States. In some states the automobile, together with the highway system, has made the tourist industry the single most important producer of wealth.

From any point of view, highway transportation is one of the most vital parts of the American economy. It brings together, when and where there is work to be done, the people, the materials, the machines and the resources to build the things we need. It helps through the growth of its own facilities to keep the economy prosperous and growing. It is also an important arm of national defense. In the words of President Eisenhower, "Next to the manufacture of the most modern implements of war as a guarantee of peace through strength, a network of modern roads is as necessary to defense as it is to our national economy and personal safety."

How Engineers Can Make Some Money "On the Side."

THOUGH the salaries that engineers draw now seem fabulous when compared with those of twenty years ago, there is still not always enough money to cover all needs. One source of extra income is writing articles for publication. This magazine uses a good many articles each month,

and it pays for all of the original articles that it uses. It invites engineers and others engaged in the public works field to contribute articles concerning their work.

The man best qualified to write an article is usually the man who has been closely connected with the work. The roving reporter can rarely master the background of what has been done and why sufficiently well to describe the work in the most useful way, even though he may be more skilled in writing than the man on the job.

If you are in doubt as to what to cover in the article, write the Editor of Public Works and describe briefly the job. You will get back explicit instructions, which you can follow readily.

There are many advantages to trying your hand at technical writing. The easiest way to find out what these advantages are, and to benefit from them, is to make a start.

A History of Wartime Sanitary Engineering Is Coming Soon

IT was thirteen years ago last July that your editor was called to Washington and given the job of creating a sanitary engineering organization that would do its share in protecting the health of our troops. During the past few months, he has been editing a portion of the history of World War II, and the work has brought back vividly the magnificent job that our engineers and other non-medical scientists did in controlling disease in some of the most unhealthy areas of the world. It is literally true that no army in history ever before survived to fight and win under similar conditions.

A history that will give to the men who did this work a part of the credit due them is almost complete; only a few items need yet to be incorporated into it, and these are being gathered and correlated almost daily. Within a year or so, depending on the speed of the Government Printing Office, we can hope to have copies.

In every corner of the world, often ahead of the bulldozers, these men of the Sanitary Corps, wrote a very large chapter in medico-military history; and what they did then is being translated now into better health for the nations of the world.



These are scientifically designed *vitrified clay filter bottom blocks* that insure trouble-free operation over the life of the filter. They provide the right ventilation and free discharge of effluent. Even after years of operation there is quick drainage and no clogging. Unskilled labor can lay these lightweight blocks easily.

Use them to insure best results from your next trickling filter. Give it a *specification floor* of TFFI *vitrified clay filter bottom blocks*. Get full engineering data by writing any member of the Institute today.



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For Best Trickling Filter Performance, Use This Specification

Underdrains—The Contractor will furnish and install underdrains which shall be laid in a dry mortar bed, on the floor of the filter before the stone is placed. Underdrains must comply with specifications, ASTM C 159-51, and shall be equal and similar to those manufactured by members of the Trickling Filter Floor Institute. The mortar shall consist of sand and cement, 1 cement to 6 sand. After the underdrains are laid and before the stone is placed, the dry mortar shall be wetted by sprinkling. Blocks must be laid in true alinement, with cross joints staggered, in longitudinal rows at right angles to the center drains.



NEW U-1091 natural gas power unit develops 187 net h.p. at 1400 rated r.p.m.; 200 net h.p. at 1600 max. r.p.m.; maximum torque, 820 lbs. ft. @ 800 r.p.m.



NEW U-450—102 net horsepower at 1800 rated r.p.m.; 110 @ 2200 r.p.m.; maximum torque, 324 lbs. ft. @ 1200 r.p.m.

NEW, Power-Packed AND READY TO GO!



NEW U-406—91 net horsepower at 1800 rated r.p.m.; 98 @ 2200 r.p.m., maximum torque, 279 lbs. ft. @ 1200 r.p.m.



NEW U-372—83 net horsepower at 1800 rated r.p.m.; 91.5 @ 2200 r.p.m.; maximum torque, 263 lbs. ft. @ 1200 r.p.m.



NEW U-269—62 net horsepower at 1800 rated r.p.m.; 72 @ 2400 r.p.m.; maximum torque, 191 lbs. ft. @ 1200 r.p.m.



NEW U-240—55 net horsepower at 1800 rated r.p.m.; 64 @ 2400 r.p.m.; maximum torque, 168 lbs. ft. @ 1200 r.p.m.



NEW U-220—50.5 net horsepower at 1800 rated r.p.m.; 62 @ 2400 r.p.m.; maximum torque, 151 lbs. ft. @ 1200 r.p.m.

IH Announces Seven New International Engines

Seven new six-cylinder, carbureted, valve-in-head engines have been added to the International line, which now includes 18 models—diesel, gasoline or gas—ranging from 16.5 to 200 net horsepower.

These new models are the result of more than 45 years of IH engineering and manufacturing experience building a complete line of heavy duty engines for tractors, trucks, construction and oil field equipment and individual power unit applications.

These new units have the durability, flexibility and economy to meet your requirements for lower cost per-

formance. The unmatched network of IH district offices, parts depots, distributors and dealers puts complete service facilities practically at your door.

If you are an individual user of engines, it will pay you to see your nearest International Industrial Distributor or Power Unit Dealer for more complete information. If you are a manufacturer, your nearest IH district office will be glad to help you engineer these engines into the equipment you are building.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS



INTERNATIONAL

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Niagara Falls selects ALOXITE[®] underdrains



Photo Courtesy of Parks, Recreation and Public Works Dept., City of Niagara Falls

Within the past ten years Niagara Falls has grown tremendously. Industries have expanded. Population has soared. And, of course, water consumption has grown apace. It may seem a paradox, but the site of the world famous falls recently was faced with an extremely tight water-supply situation.

When it became apparent that their filter capacity needed expanding, the City retained consultants to make a thorough investigation. They checked on modernizing the old plant but decided—in view of future needs—that the first step should be a new plant. Then came design and selection of the most up-to-date equipment available. In the case of filter bottoms, the field narrowed to three types. And, we are proud to say, ALOXITE aluminum oxide plates were selected.

Niagara Falls and their consultants are to be congratulated for their careful study of the filtration problem. It will bear fruit in the operation of their fine, new plant. The porous underdrain plates, as our contribution, will help materially in gaining high operating efficiency, and easy, low-cost maintenance.

Credit is due Mr. H. R. Cheek—City Manager; Mr. J. T. Fish—Director of Water Dept.; Greeley and Hansen—Engineers (Chicago, Ill.); and Roberts Filter Mfg. Co.—Contractors (Darby, Pa.).

CARBORUNDUM

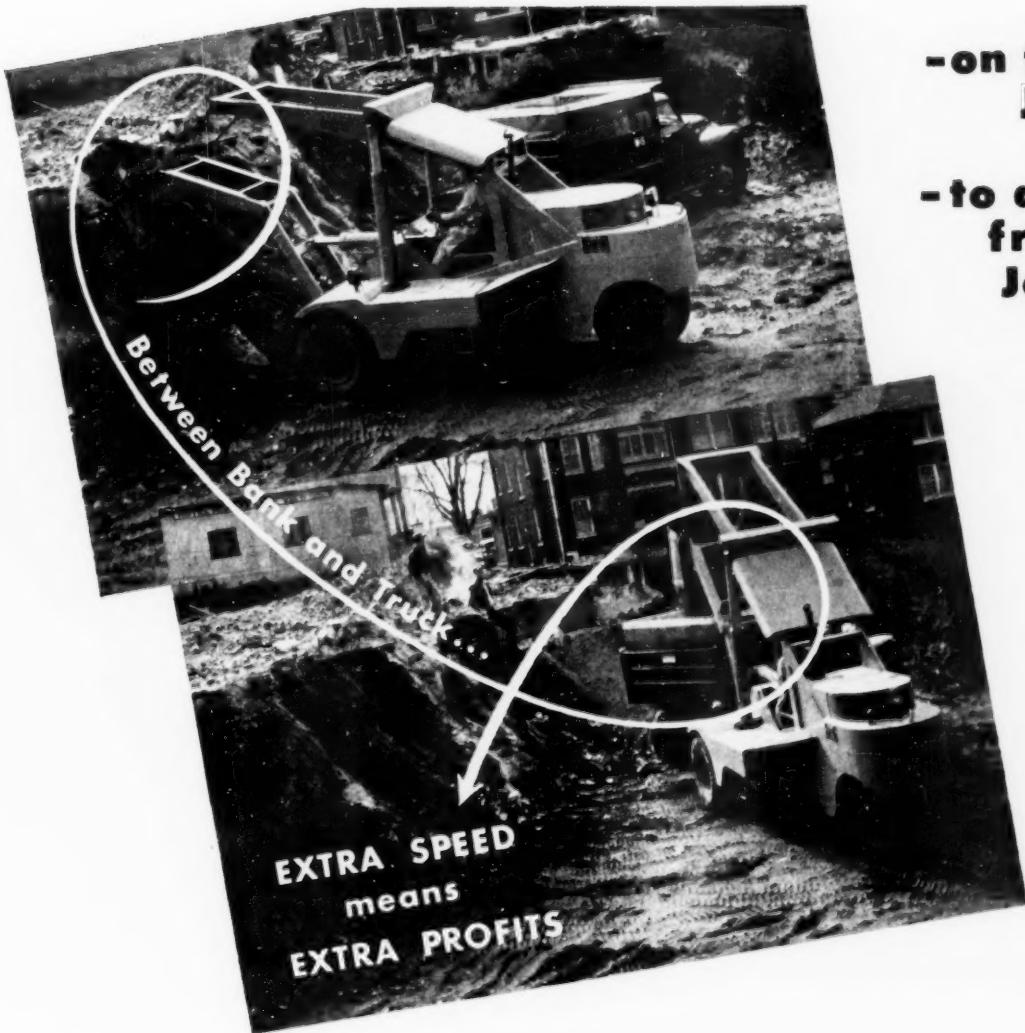
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FREE—Send for this useful 56-page booklet. It describes the different systems of filtration and diffusion—tells how to specify, order, install, operate and maintain. Address Dept. W-113, Refractories Div., The Carborundum Co., Perth Amboy, N. J.

**This Dempster-Diggster Hydraulic Shovel
gives you TRUCK-SPEED MOBILITY**



These fast moving advantages are obvious and mean the Dempster-Diggster will make more money for you.

In the first place, no hauling equipment is needed . . . no loading and unloading time or man-hours are lost in getting the Dempster-Diggster to and from jobs. In the second place, with truck-speed mobility on the job, this power-packed 100% Hydraulic Shovel gets the job done faster! Here's a shovel that won't skim the bank or bottom—but gets a full bucket with every

stroke. It's the only small shovel that offers you all the important features of big shovels . . . Simultaneous and Independent Crowd and Hoist . . . Hydraulic Crowding . . . Hydraulic Hoisting . . . Variable Crowd Action at any Dipper Position in addition to Changeable Buckets for digging or loading.

Write for complete facts on this revolutionary, power-packed hydraulic shovel. A product of Dempster Brothers, Inc.

DEMPSTER BROTHERS, 9113 Dempster Bldg., Knoxville 17, Tennessee

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Garbage collection in your city can be so simple... so economical!

LOOK at all the Heil Colecto-Pak features that mean sanitary, easy, low-cost collection of garbage and refuse. See how you can solve your garbage collection problems *simply and economically*.

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- Low loading height makes it easy for your crews to handle refuse and garbage without exertion or spilling.
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- Quick, clean final discharge of load is assured by tapered body construction and Heil Twin-Arm Hoist.

These are only a few of the many Colecto-Pak features it will pay you to investigate. Next time you buy, be sure to specify Colecto-Pak. Write for further details.



GB-1

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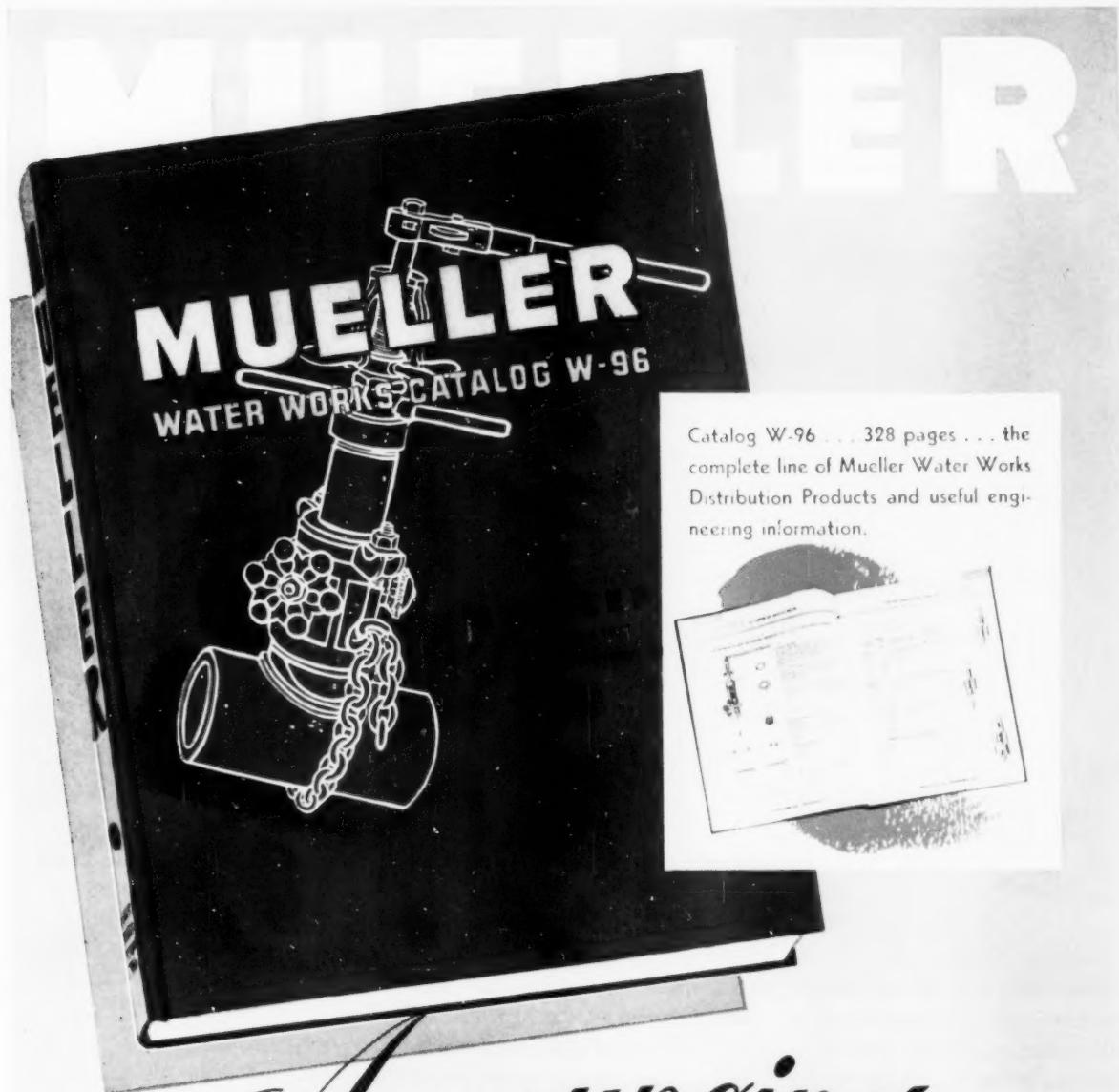
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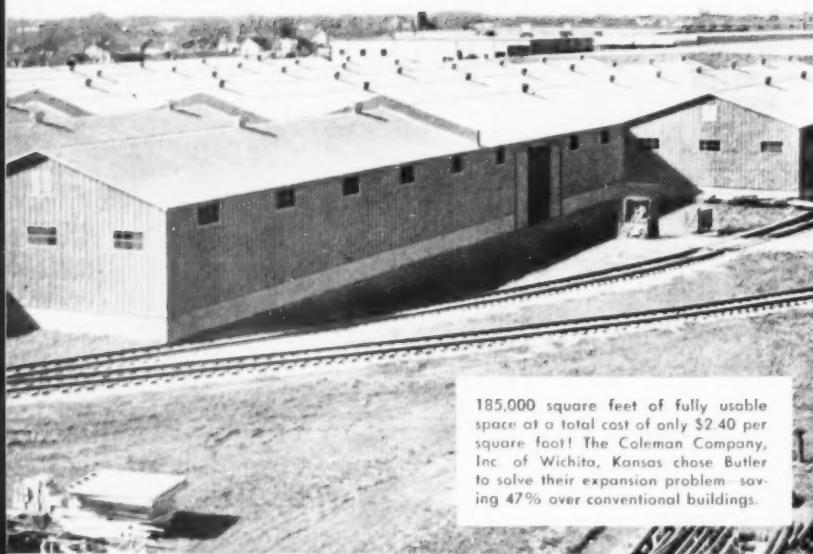


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the new Mueller Water Works Catalog

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Dependable Since 1852
MAIN OFFICE & FACTORY DECATUR, ILLINOIS



185,000 square feet of fully usable space at a total cost of only \$2.40 per square foot! The Coleman Company, Inc. of Wichita, Kansas chose Butler to solve their expansion problem saving 47% over conventional buildings.

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Butler buildings are an important part of your profit picture. Write today for full details and the name of your nearest Butler dealer.



BUTLER MANUFACTURING COMPANY

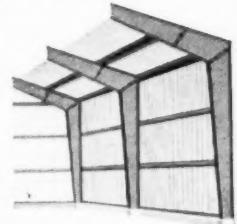
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Here is why BUTLER is a better buy

Every Foot of Floor Space is Usable

There are no interior posts or columns to waste space and create work-slowing "bottlenecks." Rigid-frame construction also shrinks maintenance costs . . . extends building life.



Fast Erection . . . Easy Expansion

Precision-punched and dimensioned bolt holes speed erection—simplify expansion or dismantling and moving. Galvanized bolts, with Neoprene rubber washers, lock deep corrugated sheets firmly to the sturdy frame.



Weatherproof Protection

The one-piece, die-formed roof ridge eliminates ridge roll—helps to make the building leakproof and weather tight.



Triple-Strength Corrugated Sheets

Butler sheeting, with deep-drawn corrugations formed on 12 inch centers, is three times as strong as ordinary corrugated sheets. Overlapping corrugations bolt tightly together for maximum strength and weather protection. Available in steel or aluminum.



Attractive Curved Eaves

The neat, die-formed eaves—which bolt to the roof sheets—add to the appearance of Butler steel buildings...increase the strength of the eaves . . . help insure weather-tightness.



Weather-sealed Windows and Base

Where corrugated sheets meet windows or the foundation, they are tightly crimped for a snug fit that keeps out snow, moisture and rodents.



How Martinsville gets iron-free, soft water



Martinsville, Illinois Municipal Water Plant. Constructed in 1950.

MARTINSVILLE'S untreated well water was very hard . . . an extremely wasteful nuisance!

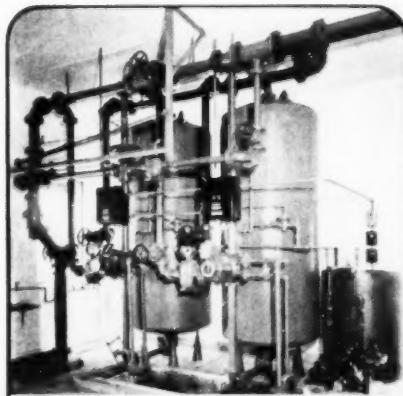
Its 269 ppm of total hardness ruinously scaled pipes and water heaters. And further annoyed citizens by wasting soap, leaving unsightly rings around bathtubs, sticky curd on dishes and laundry. Iron of 2 ppm—which gave the water an unpleasant metallic taste—caused objectionable stains on plumbing fixtures and laundered fabrics.

These troubles were ended when Martinsville installed the Permutit equipment shown. On a recent check, we asked for the operator's opinion of our equipment.

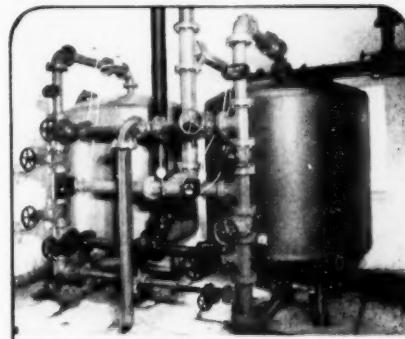
Mr. O. Wiser—who is in charge of the Martinsville Municipal Water Plant—reports: "The Permutit equipment is very good . . . has worked very well with very little maintenance."

Free Technical Bulletins

Write today for full information on any water conditioning process or problem. THE PERMUTIT COMPANY, Dept. PW-11, 330 West 42nd Street, New York 36, N. Y.



Permutit softeners remove hardness, further reduce iron to 0.02 ppm! Automatic regeneration saves time . . . provides constant supply of softened water.



Compact Permutit pressure filters have a 150 gpm capacity...remove iron oxidized in coke-tray aerator, reduce turbidity.



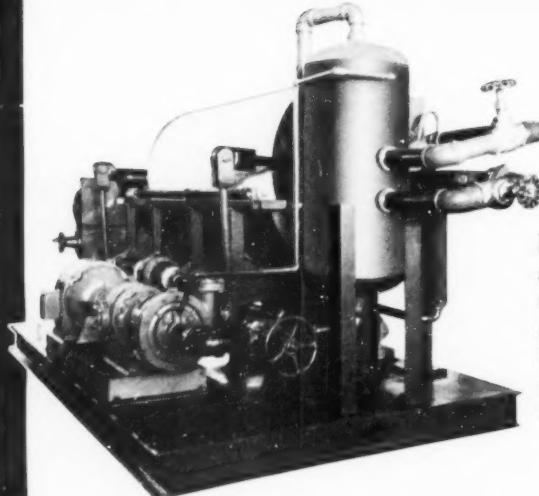
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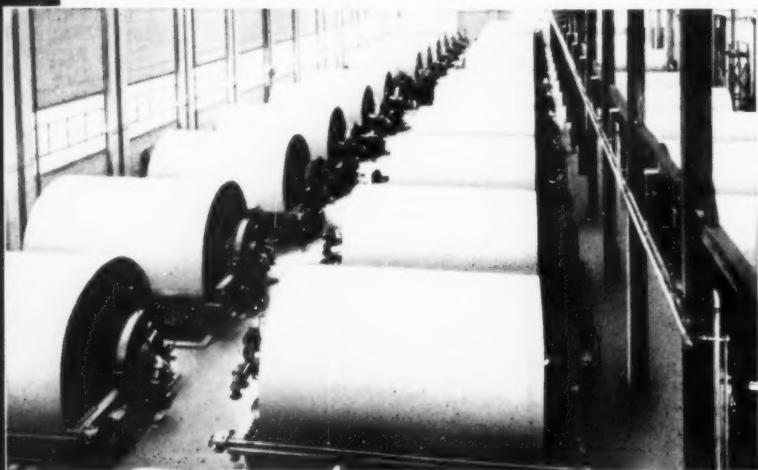
dependable
process
equipment
built to
fit your
needs

CONKEY FILTERS FOR SLUDGE

66 Conkey Sludge Filters installed in one plant of Chicago Sanitary District. Built to exacting specifications and rigid design requirements.



Large or small—a Conkey filtration plant can serve you well. Left, a self-contained package unit.



PROCESS EQUIPMENT DIVISION



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dynamic new engine gives the popular D Motor Grader increased work power

The thousands who own Allis-Chalmers Model D's know the ability of these versatile machines to do outstanding work on both construction and maintenance jobs. Now — with extra power and added features — the Model D sets even higher performance standards in the low-cost grader field.

Dynamic New Power Crater Engine gives the Model D reserve power to : (1) handle the same loads in higher gear or bigger loads in the same gear, (2) increase road speeds, especially where there are grades, (3) reduce need for shifting, thus lengthen clutch life, (4) give better all-round maneuverability. There's plenty of power to crowd while loading with the rear-end loader. Engine throttles down to half speed and still does the same job — on low-speed work.

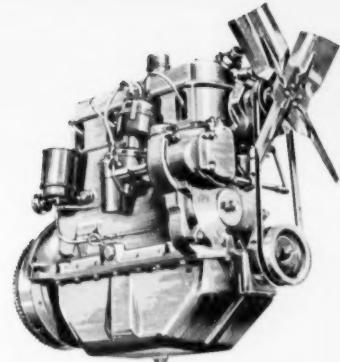
Leaning front wheels* enable the Model D to handle new jobs . . . counteract side-draft on ditching and bank cutting.

Power circle turn* permits easy positioning of blade from operator's seat. When finishing subgrade or blacktop, for example, moldboard can be readily rotated without disturbing road surface.

These and other big grader features — such as ground-gripping Tandem Drive, ROLL-AWAY Moldboard, Tubular Frame and Power Controls — combined with extra power make the Model D the accepted leader in the low-cost grader field. Ask your Allis-Chalmers dealer to demonstrate on your own job.

ROLL-AWAY is an Allis-Chalmers trademark.

*Optional equipment

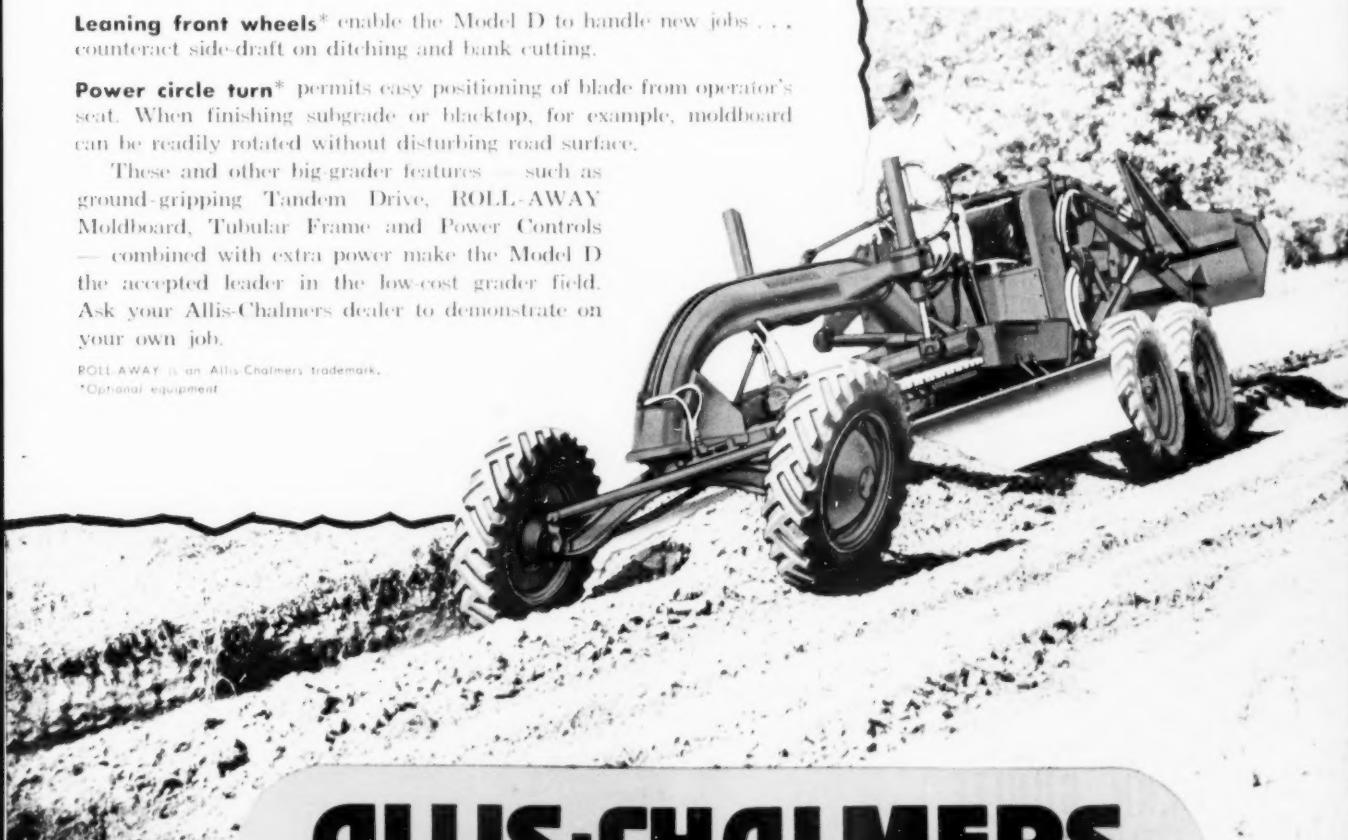


POWER CRATER Engine
brings *truly modern power*
to the Model D



This new engine boosts power while using less fuel per horsepower. It obtains high-octane performance when using regular gasoline. Only by watching a new Model D work can you fully realize what this truly modern engine adds to its performance!

Weight: 8,800 lb. (bare) • Brake Horsepower: 50
4 Speeds forward to 25.6 mph.
Reverse Speed 3.3 mph.



ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

TAPAX
Takes the BANG out of
Manhole Covers

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TAPAX—a matter of
minutes

Brush Away
Dirt & Gravel

Cut Required
Length

Place Tapax
sticky side down

Replace
Cover

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JOSEPH G. POLLARD CO., Inc.
Pipe Line Equipment
NEW HYDE PARK, NEW YORK

UP FRONT FOR ADEQUATE ROADS

BY
LEO J. RITTER, JR.

Research in Texas — Congratulations are in order to the Texas Highway Department and officials of the Texas A & M College System upon the formal establishment of a Highway Transportation Research program for Texas. Three of the people responsible for the program are shown below; they are D. C. Greer, State Highway Engineer, Thomas H. Mac Donald, former Commissioner of Public Roads and now Distinguished Research Engineer with the A & M College System, and Gibb Gilchrist, formerly Chancellor of Texas A & M College and also former State Highway Engineer.

Work on the program is to be undertaken on a project basis. Projects will be proposed by members of both organizations' staffs through their respective heads. Existing laboratories of all parts of the A & M College System will be available for the studies and new facilities have already been authorized by the A & M Board. After a project has been jointly approved, a project leader and research staff will be selected. Projects which have been approved under this program include a study of customer requirements for high-

way transportation, a study of weak soil deposits which must support highway embankments, inspection of welds on structural steel by gamma ray techniques, design of under-reamed footings, and improvement of asphaltic materials. Texas has long been a leader in highway research and this new effort will undoubtedly provide additional stimulation and expansion of the program. In civil engineering the A & M College of Texas has made many notable contributions to highway knowledge under the leadership of the late J. T. L. McNew and others. Fred J. Benson is currently Professor of Highway Engineering at A & M.

With Regret — The highway field has recently lost two of its outstanding leaders. One of these was H. E. Hilts, Deputy Commissioner of the Bureau of Public Roads, who died suddenly early in September at the age of 70. Mr. Hilts had spent a lifetime in outstanding highway service. The second loss was that of John Bateman, Professor of Highway Engineering at Louisiana State University, who died from a heart attack late in August. Author of one of the outstanding textbooks in highway engineering, Professor Bate-

(Continued on page 112)



• LEFT to right: Mr. Gilchrist, Mr. Greer and Mr. MacDonald.

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Here today - and still here tomorrow that's the story of America's oldest CONCRETE streets

These concrete streets around the courthouse in Bellefontaine, Ohio, are the oldest concrete streets in America. They were paved in 1893. These photos were taken in 1926 and 1952.

These old streets carry weights and volumes of traffic never anticipated 60 years ago. They show the scars of long, hard use but are still earning dividends on the original investment.

Such durability and **low-annual-cost** service is typical of concrete pavement. And today, be-

cause of improved design, materials and construction methods, concrete pavements can be built to give even better and longer service.

Concrete pavement also is safer. It is skid-resistant, wet or dry, and its light color provides maximum visibility at night.

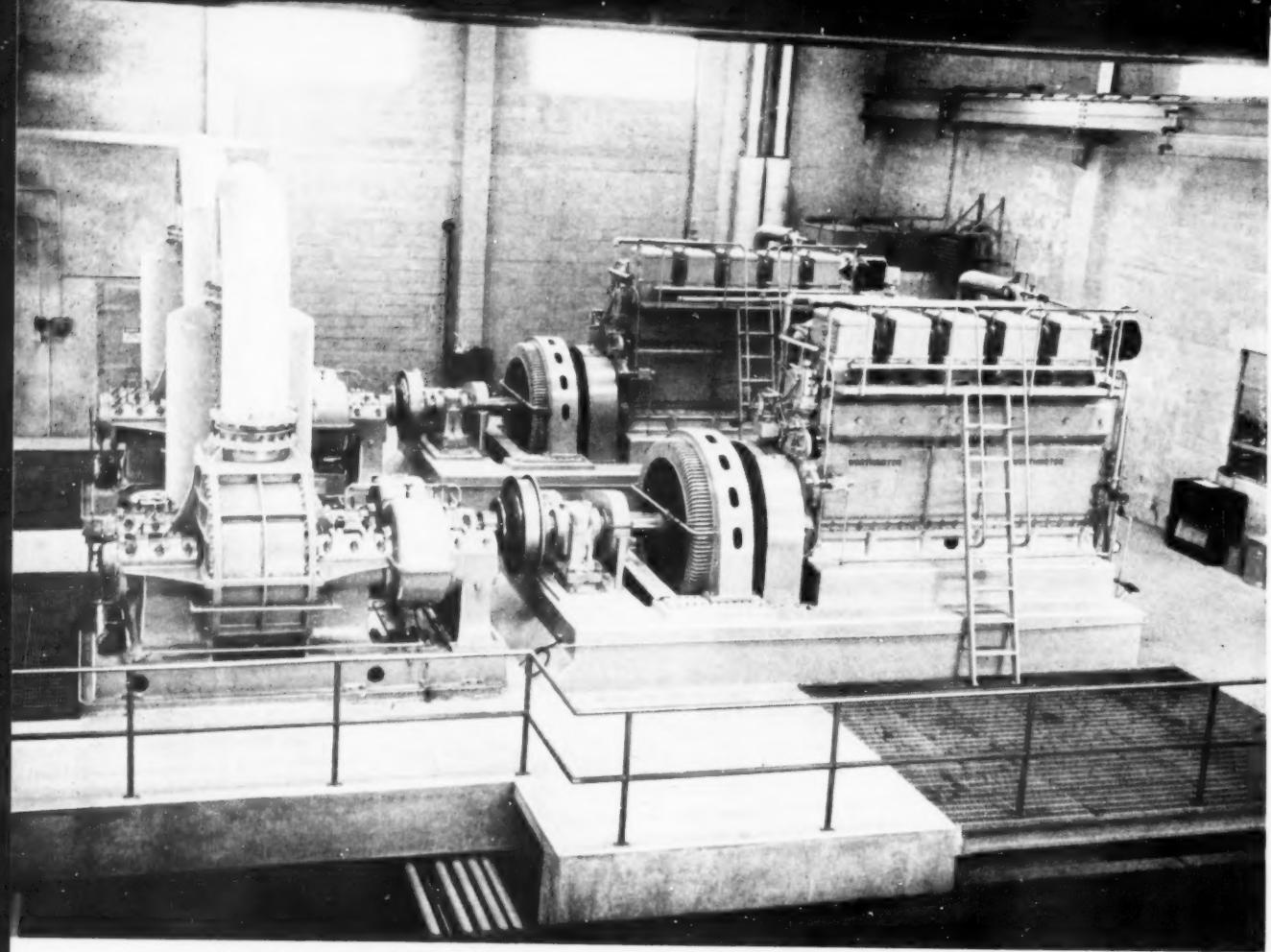
For additional information on designing and building long-lasting, safe, **low-annual-cost** concrete streets write for free literature. It is distributed only in the U. S. and Canada.

P O R T L A N D C E M E N T A S S O C I A T I O N
DEPT. A11-89, 33 WEST GRAND AVENUE, CHICAGO 10, ILLINOIS

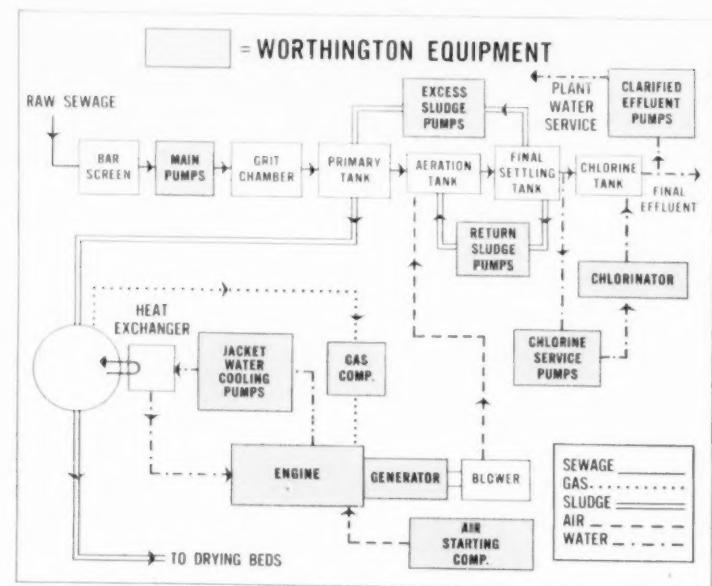
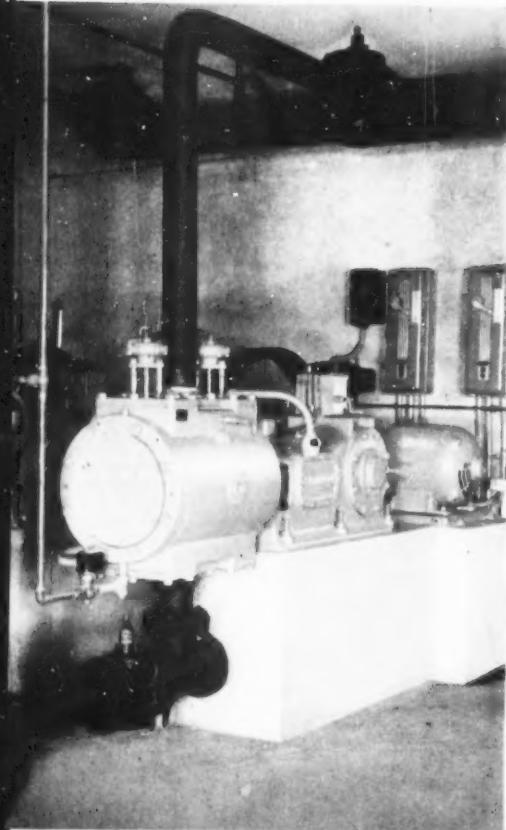
A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work



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LITTLE FERRY STATION GETS POWER for its generators and blowers from these Worthington Dual Fuel Engines.



FLOW DIAGRAM of the Little Ferry Station.

GAS COMING FROM THE DIGESTERS is compressed by this Worthington gas compressor and then sent into the engines of the Bergen County Sewer Authority's Little Ferry plant in New Jersey.

10 New Jersey communities unite to remedy stream pollution

On November 17, 1951, stage 1 of the Little Ferry treatment plant of the Bergen County Sewer Authority was officially opened.

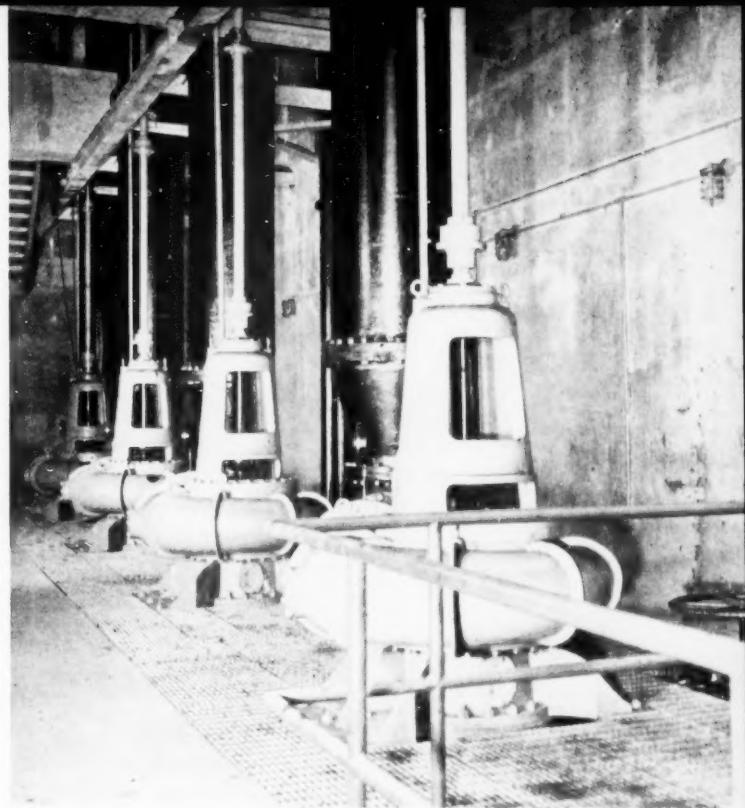
This plant, part of a system that eventually will handle the sewage of about 50 New Jersey communities, is the result of a cooperative effort by 10 of these municipalities. Approximately 21 towns are eligible to participate in the stage 2 development by the Authority, contract plans for which are completed.

Formerly, most of these communities dumped raw sewage directly into the Hackensack River. They found they could solve their sewage problems collectively in a far more effective and economical manner through the Bergen County Sewer Authority.

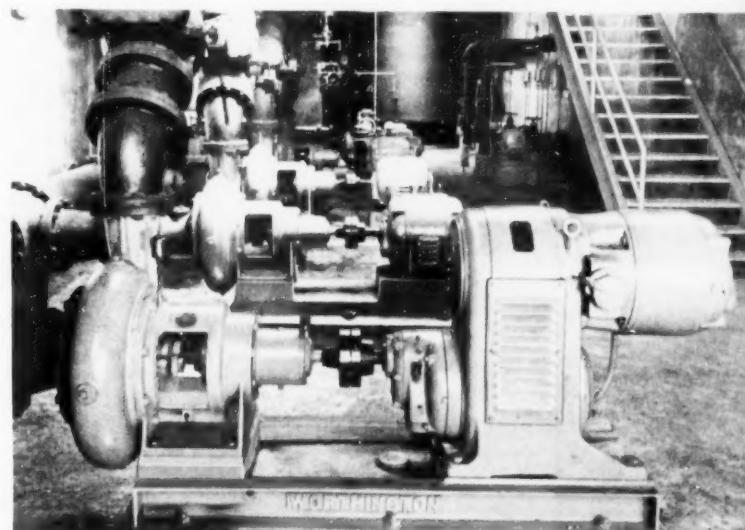
The Authority's idea was that one large plant, equipped with dual fuel engines to generate the required power, would be able to handle the entire job with the greatest efficiency. In addition to supplying the huge dual fuel engines driving the generators and blowers, Worthington furnished the main raw sewage pumps, excess and return sludge pumps, chlorinator service pumps, clarified effluent pumps and the gas compressors.

Worthington can completely equip your sewage plant, too. Write us today, stating your municipality's requirements. We'll be glad to make recommendations—at no obligation. Worthington Corporation, Public Works Division, Section W.3.6, Harrison, New Jersey.

W.3.6



MORE THAN 20 MILLION GALLONS OF SEWAGE are handled daily by these four Worthington sewage pumps at Little Ferry.



CLARIFIED EFFLUENT AND EXCESS SLUDGE are handled by five Worthington centrifugal pumps. The speed of the unit in the foreground can be increased or decreased to compensate for variation in the flow.

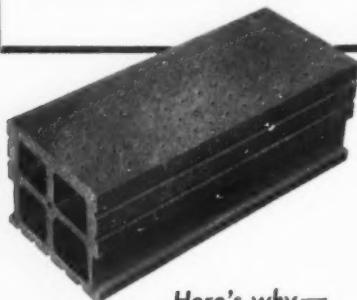
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ALL MAJOR PUBLIC WORKS EQUIPMENT UNDER ONE RESPONSIBILITY

Water Works Pumps • Sewage Pumps • Comminutors • Vertical Turbine Pumps • Vacuum Pumps

IT PAYS TO *Specify*
LEOPOLD
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FILTER BOTTOMS



Here's why—

Permanent • No corrosion or tuberculation • Equal distribution • Low loss of head • Requires only small sized gravel • No metal in contact with water!

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Adjustable VALVE BOXES

TWO PIECE

sliding or screw type cast iron valve boxes for covering 4" through 10" valves for water or gas. Rugged construction for life-time service. 5 1/4" shaft. Extensions as required.

THREE PIECE

valve boxes supplied with separate base boxes are available in sliding or screw type. Made with 5 1/4" and 7" shafts with extensions as required. Also, a complete line of service and roadway boxes.



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People, Ideas and Events

BY "DOC" SYMONS



H.T.M.A. — And this is the month when the turkey is the important bird. It's also the month of Cage Bird Week, National Cat Week, Accordion Week, Sadie Hawkins Day and the Raisin Harvest Festival, among other "days" and "weeks". Wonder why we don't have an "Appreciate Your Water Works Week?"

★ ★ ★

Mail Bag — A note from Joe Wafer, Vice Pres., Ind. Chem. Sales Co. (Nuchar — plug) — "Dear Doc: I got a great deal of amusement out of the "third generation" mentioned in your column of the September issue of PUBLIC WORKS.

"I can well remember the incident of Jimmy taking the pictures in the main dining room of the Chelsea Hotel (in Atlantic City) with Papa 'Doc' Symons sitting up in the balcony as a guide to whether the bulbs should or should not be wasted as the situation developed. I got a great kick out of your nodding yes, if the person was prominent or an active member of the AWWA and likewise a negative shake of the head if the person involved was a 'peddler' or less prominent. At least, 'Doc', you did put on a good show for me that evening to watch how the power of the press works with respect to the taking of photographs—Sincerely, Joe".

Thanks Joe—I've been kidded about that before; the real explanation was that Jimmy only had a limited number of flash bulbs and I was keying him as to the principal awards, not the awardees—but your version makes a better story.

I often wonder—who was the wit who said that the hydrant tax should be changed to a Dog Tax because they get the most use out of hydrants.

★ ★ ★

Rumor Hath It — That E. A. "Siggi" Sigworth, the Nuchar man and perennial chairman of Transportation for AWWA conventions is leaving the water works field to work

in the oil field (not oil fields) selling Nuchar to clarify or decolorize or deodorize oil—or something.—We'll all miss you, "Siggi".

★ ★ ★

Left Handed Invitation — By now you all know that the N. Y. Section AWWA held its September meeting at the Lake Placid Club. What you don't know is how come Ray (Mr. Water Works, Jr.) Faust, Exec. Asst. Secy., AWWA, came to be the after-dinner speaker.

Seems the committee told Ray how the hotel charges for the dinner would be increased considerably if the waiters had to delay cleaning the tables until after a principal speaker had finished his address. "We can't afford that", said the committee to Ray, "so we can't have a principal speaker—so, will you talk after dinner?"

★ ★ ★

Swedefinition — "Rocky Mountains—What prices are slightly higher west of."

★ ★ ★

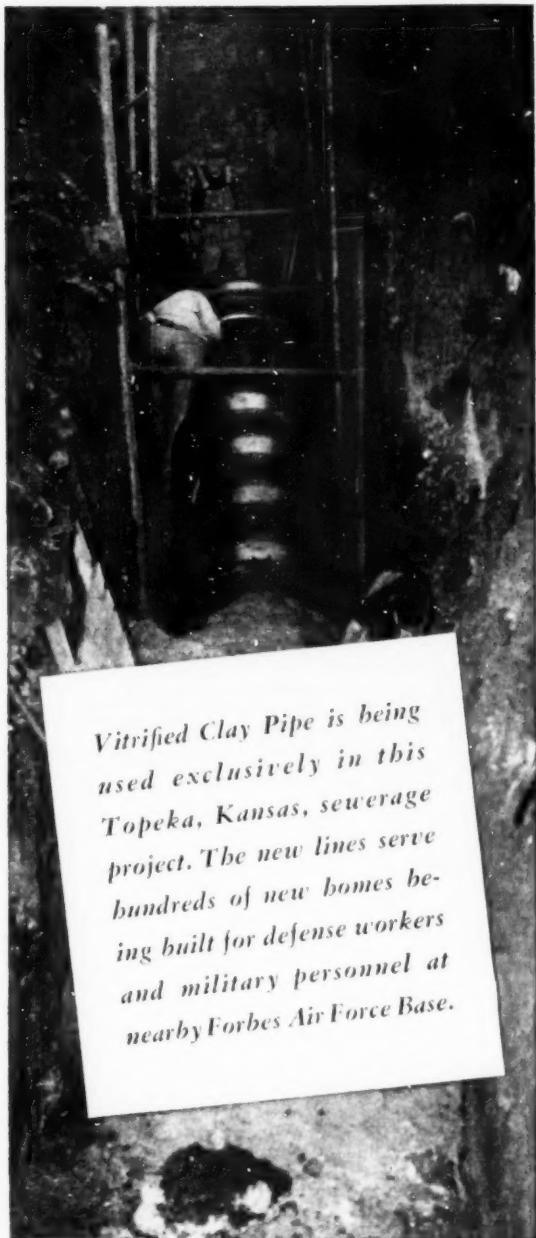
Enquiring Reporter — Buffalo, N. Y. (my old home town—for seven years anyway), where the water consumption is 200 gal per cap per day, is getting ready to install fluoridation—with no reference to this whatsoever, the Enquiring Reporter of the Buffalo Courier Express asked six persons, "Should the City of Buffalo have water meters?"

Three ordinary citizens said "yes, it would cut down your waste, put payment for service on a fair basis", etc., etc., etc. Fred Crane, Commissioner of Public Works also said, "Yes" and briefly explained why from the standpoint of fairness, wastage, savings to the taxpayers, etc. Ted Jarlinski, Director of Water said "yes" and explained why from the standpoint of operation.

Lone dissenter was a councilman who said, "Emphatically no . . . the home owner now is paying his share of the costs of our water plant

(Continued on page 121)

Topeka Specifies Vitrified Clay Pipe



Vitrified Clay Pipe is being used exclusively in this Topeka, Kansas, sewerage project. The new lines serve hundreds of new homes being built for defense workers and military personnel at nearby Forbes Air Force Base.

For \$175,653 Defense Housing Sewer Project

As a rapidly growing critical defense area, Topeka, Kansas, has a double sewerage problem. First, it must provide immediate sewerage facilities for hundreds of new homes. And second, it must make sure those new sewer lines are permanently corrosion-proof — because they serve an area that is slated for industrial expansion. The Topeka City Commission is solving both of these problems by specifying Vitrified Clay Pipe.

Regardless of the strong home detergents or industrial wastes that may flow through the lines—today or a hundred years from now—Clay Pipe is *sure* to last. Acids and gases can't corrode it . . . time can't weaken it. Clay Pipe is backed by a 50-year guarantee.

When you specify or install sewer lines, don't take chances — use Vitrified Clay Pipe. *It never wears out!*

C-753-1

NATIONAL CLAY PIPE MANUFACTURERS, INC.

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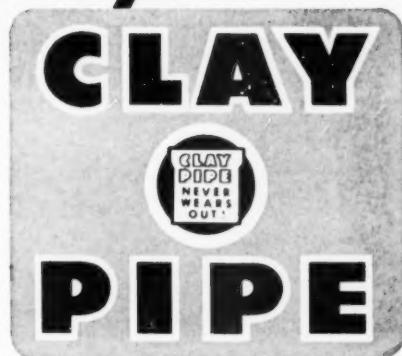
206 Connally Bldg., Atlanta 3, Ga.

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ESSENTIAL • ECONOMICAL • EVERLASTING

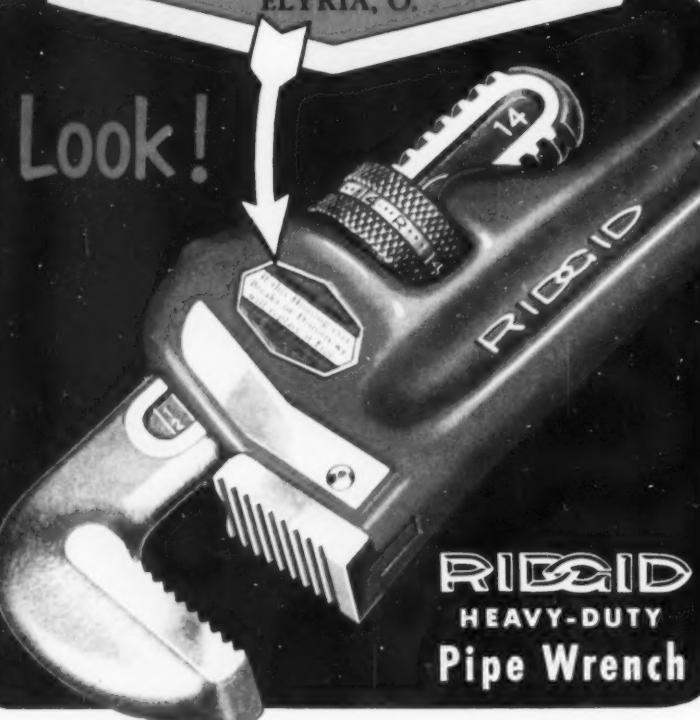


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Breaks or Distorts we
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Pipe Wrench

Guarantee that has saved money for millions of users for 30 years

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- * Adjusting nut that spins easily to size, 6" to 60".
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- * 100% factory pipe testing of every wrench!
- * Always the most for your money! Buy RIDGID's at your Supply House.

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LEADERS IN PUBLIC WORKS

William A. Bowes was appointed to the Portland, Oregon, City Council in 1939 and has been elected and re-elected to it ever since. His present term expires in 1956. He has served as Commissioner of Public Works since his initial appointment and has been associated with the many public works improvements that Portland has made during these years, including the new sewage treatment plant just put into service.

As Commissioner of the Department of Public Works he has supervision over the Office of the City Engineer, with its Bureaus of Construction and Maintenance; building, city planning, traffic, transportation and maintenance, surveys and drafting, the municipal paving plant, and sewerage and refuse disposal. Though not an engineer, he has sponsored many of the city's outstanding engineering projects, including the Front Avenue and Harbor Drive, the one-way traffic grid system and adequate sewage treatment. He was president of the League of Oregon Cities in 1951 and 1952 and belongs to many local and civic organizations, including the American Legion and the American Public Works Association.

Married to May R. Henchman in 1924, the Bowes have two children, a daughter (Mrs. Don Dean) and a son, William E., now in the Air Force. He says he has no hobbies—he just works at public works.

Facts

About Your Budget

Ever see a budget you didn't have to s-t-r-e-t-c-h to cover even the "must-have" items on the list? Here's help! You really stretch your budget dollars, make them do more and go farther when you specify "Cleveland" for your trenching equipment. You do more trenching work—better, faster and cheaper—use less equipment—require smaller yearly investment—fewer manhours—smaller payroll—less repair and maintenance—with Clevelands. And their rugged, quality-construction and their proved extra long work-life mean that you *won't* be budgeting for replacement of worn-out equipment for years to come!

About Cleveland "Baby Diggers"

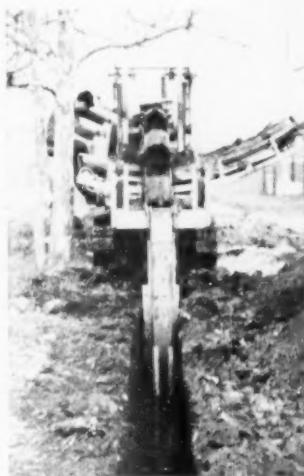
About Cleveland "Model 80" Backfiller—Tamper—Side Crane

- One machine, one man operated does *three* big trench completion jobs: ① lays pipe, ② fills trench, ③ tamps fill—*plus* all types of light side crane work, pulls crossings, loads and unloads pipe, valves, etc.
- Lays pipe safely, smoothly with minimum man power. Over 3,000 lb. capacity at 6 ft.
- Live, telescopic boom, long reach. Sure clutches, smooth brakes.
- Backfills fast and clean from either side of trench—*toward or away from* machine. Fits wide range of trench sizes. Easy on lawns, sidewalks, etc. Does a beautiful clean-up job.
- Tamps thoroughly—delivers over 470 ft. lb. blow 42 times per minute—produces maximum practical compaction. Backfills, tamps, travels simultaneously. Travels *parallel* to trench, minimizing traffic interference.



LAYS PIPE . . . FILLS TRENCH . . . TAMPS FILL

- No specialists—but versatile, performance-proved experts on all types of trenching jobs.
- Most efficient digging element, the wheel, digs all soils, in all weathers.
- Compact, highly maneuverable, easy to work in tightest places, right up to building walls, between obstructions, etc.
- Extremely portable—cover scattered jobs easily—travel at truck trailer speed.
- Better public relations—easy on walks and driveways, no tires to spin and gouge lawns.
- Choice of models—depths from 3½' to 5½', widths from 9" to 24", digging speeds from 6" to 29" per minute, providing right speed and power combination for every job condition.



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Quality in design and construction produces more trench—in more places—at less cost.

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SEWAGE TREATMENT
PLANTS Modernize WITH

HOMESTEAD Self-Sealed...Lubricated PLUG VALVES



HOMESTEAD "SELF-SEAL" LUBRICATED PLUG VALVES controlling raw, recirculated and digested sludge of 15 lbs. to 20 lbs. working pressure to heaters, digesters, and drying beds in a Sewage Treatment Plant.

- 1 THEY'RE SELF-SEALING.
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- 3 HAVE 100% LUBRICANT SEAL AROUND PORTS.
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Homestead's exclusive Self-Sealing feature combines the positive sealing action of the tapered plug with the free turning action of a cylindrical plug type valve. And because they are Self-Sealed—*automatically adjust for wear as wear occurs*—they assure extra long, leakless service . . . more operations between lubrications . . . require less maintenance and materially lower plant operating costs.

More than 10 years of gruelling service in almost every type of industry has proved them to be the lowest-cost-per-year means of fluid control within their service range.

We make them in semi-steel or cast steel; 100% port area or Venturi type; sizes $\frac{1}{2}$ " to 14" for 200 lbs. oil-water-gas working pressures; in Straight-Way or Three-Way types for Wrench or Worm and Gear operation, with High or Low Head Extensions, and Hand Wheels or Floor Stands.

Self-Sealing or one-piece plugs optional in Straight-Way type; 3-Way type has one-piece plug only. Complete data and prices on request.



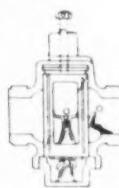
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Homestead's patented "Self-Seal" principle is, we believe, the simplest and most effective sealing principle yet developed for lubricated plug valves.

In addition to a full lubricant seal around the ports, and around the top and bottom of the valve, the wedge-action of the plug under line pressure causes the finely-finished surfaces of the plug to press outward against the sealing surfaces of the body.

This self-sealing action keeps the plug surfaces in contact with the bore of the body. The plug automatically adjusts itself for wear, thus assuring extra long life and maximum leakless service.



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LETTERS TO THE EDITOR



SURFACE MAINTENANCE

Congratulations on your editorial in the July 1953 issue, entitled "Do We Need a New Surface Treating Material?" Low-cost surface maintenance of worn and oxidized bituminous pavements is universally important.

However, the answer is already at hand. "Old" materials are actually doing the job. Mixing Grade Asphaltic Emulsion, diluted with about equal parts of water and applied at from $1/4$ to $1/3$ gallon per square yard (of the dilution), meets practically all of the requirements you stipulate—namely, low-cost surface renewal and seal with rapid drying and no interference or pick-up under traffic. No cover material is required and yet the surface remains non-skid. The application may be repeated every few years without danger of over-asphalting on the surface.

Many Highway Departments throughout the country are now starting regular schedules of diluted asphalt emulsion seal coating.

K. N. Cundall
American Bitumuls &
Asphalt Co.
San Francisco, Calif.

"HAWGS" IN MICHIGAN

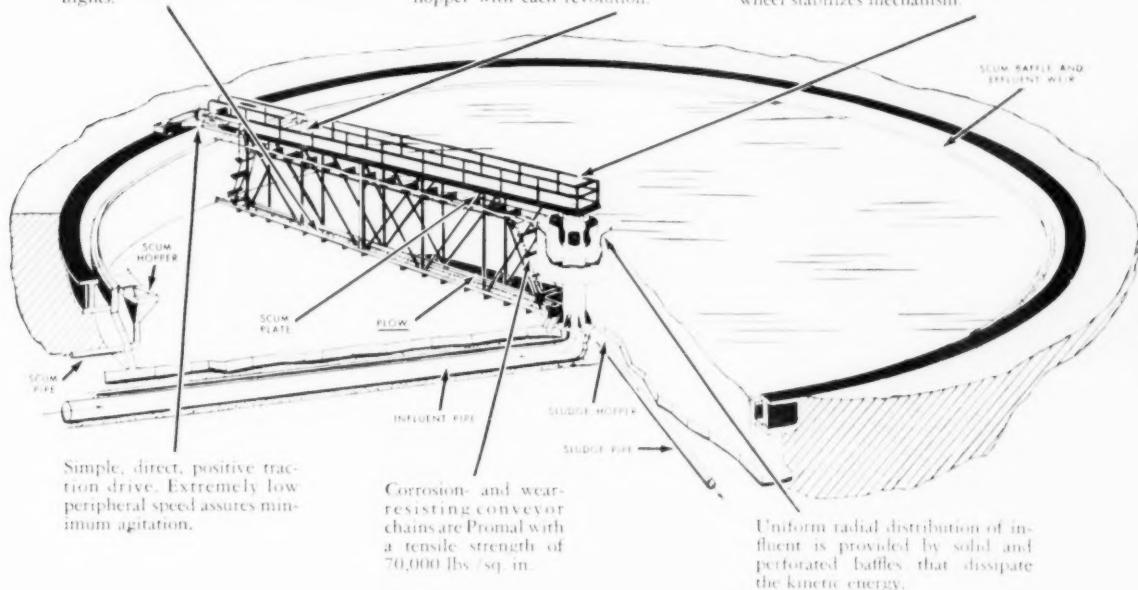
We will look forward to receiving the new edition of the Trickling Filter Handbook.

Now about your post script "How about an article some day soon?" Let me explain the situation this way. First, I've got a long standing friend, Bob Fuoss, who came from a farm ten miles out of town, and with whom I used to carry on a relatively lively correspondence. Since Bob got a job on the editorial staff of the Post, I've been unable to write him for fear that my punctuation and spelling would not be correct. So you see, whenever you mention editors and magazines, I quickly shrink away.

Settled sludge is collected by a plow with a brass squeegee and carried continuously to the drawoff hopper by the slow-moving conveyor with steel flights.

Floating material is carried to a trap at the outer end of the bridge by the return run of the conveyor and discharged into the scum hopper with each revolution.

Rugged bridge pivots on a large ball bearing. Outer end is mounted on a solid rubber tired traction drive wheel equipped with anti-friction bearings. Forward wheel stabilizes mechanism.



Uniform radial distribution of influent is provided by solid and perforated baffles that dissipate the kinetic energy.

Removes all sludge from tank floor in one revolution

LINK-BELT Circuline Sludge Collector offers efficiency of Straightline Action for round settling tanks

GET quick, positive sludge and scum removal from round settling tanks with Link-Belt Circuline Sludge Collectors. Famous Straightline action provides high efficiency and greater solids concentration.

That's because maximum sludge concentration and complete sludge and scum removal are accomplished—in the shortest time—without septicity . . . without maintaining any sludge blanket.

Circuline Collectors are part of the complete Link-Belt line of quality equipment. Our sanitary engineers will be glad to work with your engineers, chemists and consultants to give you the best in modern water, sewage or industrial liquids treatment equipment.



In water, sewage and industrial liquids plants, intermittent operation (usually once or twice per day) assures high efficiency and real economy. In final tanks of activated sludge plants operation is continuous.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.



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Toledo, Ohio

Second, I believe that a man writing an article should have his hands dirty with the job he is writing about. The desk over which I work is once removed from actual operation.

Third, during the last six months public works in Michigan has been synonymous with garbage feeding to swine. For example, we are holding a rather elaborate get-together on Mackinac Island for all of the municipal officials in Michigan. In preparation for this meeting, I gathered the public works officials together and asked them what they wanted to talk about. I offered them the world, and their reply was "hogs". Because of the monotonous insistence of this subject, I am sick unto death and fain would lie down, and will leave all such article writing to Bob Bugher.

So you see, I have all of the defenses which enable me to procrastinate rather than do the job soon. Let me keep open your kind suggestion with, "Well, perhaps, one day."

*Gilbert Chavenelle,
Staff Engineer,
Michigan Municipal League*

USING THE MANUALS

During reviews of community facilities projects, we have made considerable use of old editions of "The Water Works Manual" and "The Sewerage Manual" which have been on file in this office. If copies are available, may I have one each of the latest editions of these two references, for use in connection with the Public Health Service Community Facilities Program.

*James A. Anderegg
Community Facilities Engineer
Public Health Service
Atlanta, Ga.*

Water Pressures and Consumer Interest

Water consumption is affected not only by the interest of consumers in television programs (see *Public Works* for March, 1953) but by other happenings as well. The meter charts of the Glasgow, Scotland, Water Dept. showed a very marked drop in consumption during the two minutes' silence on the day of his late Majesty's funeral. Also the pressure in a supply main of the Sunderland and South Shields Water Co. (England) rose rapidly from 136 lb. to 148 lb. shortly after 3 p.m. last Christmas Day and remained there throughout the Queen's broadcast.

Now's the time to mail this month's Reader's Service card.



If it's concrete . . .
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**world's largest manufacturer of
concrete sewer and culvert pipe**

can make it



26 plants for convenient, economical service.

**30 years' experience in pipe,
cribbing, precast manholes, river-
weights, flat base pipe. Name it,
we make it!**



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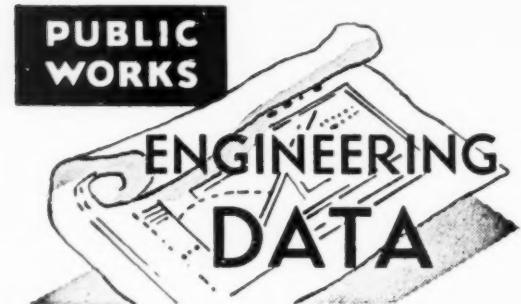
Just what you need for trenching utility lines, sewer systems, septic tanks, drainage, etc. A low priced, fast operating, tractor mounted, ladder type trencher. Cuts 6" to 20" wide trench down to 7' depth. Average digging speed 350' to 400' per hour. (digs up to 800' per hour) Digs all soils the year 'round, (super-service cutters for rocky soils or frozen ground). Independent control of each drive wheel assures exact regulation for straight or curved trenches. Mounts on Ford or Ferguson tractor — easily transported — one man operated. Bulldozer blade available for backfilling. Write for complete details today.

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Costs of Laying Water Pipe in Hartford, 1952

In the annual report for the Hartford, Conn., Water Bureau for the calendar year 1952, the following costs of laying water pipe are reported: For 6-inch pipe, 1,896 ft., cost per ft. \$3.379, of which \$0.958 was for labor, \$2.004 was for materials and \$0.417 was for miscellaneous. For 8-inch pipe, 35,428 ft., cost per ft. \$4.804, of which \$1.013 was for labor, \$2.936 for materials and \$0.855 for other costs. For 12-inch, 18,356 ft., cost per ft. \$6.353, of which \$1.449 was for labor, \$4.778 for material and \$0.126 for miscellaneous. For 16-inch, 1,100 ft., cost per ft. \$13.740, of which \$4.104 was for labor, \$9.142 for materials and \$0.494 for miscellaneous. These costs do not include overheads.

Cleaning Surfaces Contaminated with Radioactive Debris

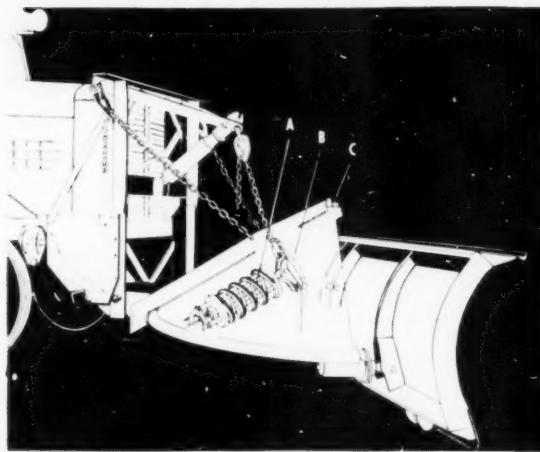
Chemical compounds known as sequestrants offer the best means for cleaning the surfaces contaminated with radioactive debris, according to the results of a two-year research program undertaken at Foster D. Snell, Inc. Details of the study were presented in June and July at the International Congress of Industrial Chemistry in Paris, and the International Congress of Pure and Applied Chemistry in Stockholm. Resumes of these reports have appeared in *Chemical and Engineering News* and in *Newsweek*.

Among sequestrants, the most economical to use is Calgon, a modified form of sodium hexametaphosphate. When two parts of this harmless chemical are mixed with one part of either soap or syndet and applied in one per cent solution in water, removal of the radioactive contaminant from nearly all surfaces is complete. As a typical example, water removed 47% of the contamination from frosted glass, 1% solution of soap removed 81%, but in admixture with two parts of Calgon, thus using only one-third as much soap, 98.8% was removed.

Rat-Resistant Construction Materials

In a study to determine the resistance of construction materials to penetration by rats, panels of construction materials, including aluminum, were exposed to gnawing by wild roof rats. In specially designed cages, single sheets of test materials were used as barriers between the rats and food and water. The rats, kept on reduced rations, attacked the panels in an effort to reach the bait.

The study showed that rats require a gnawing edge to make any appreciable progress in penetrating materials. They can develop such an edge on soft materials, but with harder materials they require a construction joint or a fracture as a point of attack.



the
"TRIP-BLADE"
FRINK ...

**... CLEANER ROADS
 SMOOTHER OPERATION**

The Frink Reversible Trip-Blade Sno-Plows have a constant pressure tripping mechanism that gives smoother operation and cleaner roads under all operating conditions.

This feature consists of a pre-loaded trip spring (Fig. A) with moldboard connecting linkage (Fig. B) that keeps the pressure constant throughout the entire tripping motion. This prevents any chattering, no matter what position to which the moldboard is adjusted. The two units operate together to quickly return the plow to normal operating position after an obstruction is passed, without losing snow at the ground line.

The moldboard is so suspended from the Drive Frame Assembly that the pivotal point (Fig. C) comes directly above the cutting edge. This eliminates swinging the moldboard from one side or the other of the truck when the blade is reversed.

Frink Reversible Type, One-Way Type, V-Type Sno-Plows and the Frink Auto-Broom are interchangeable on the same truck attachment.

For further information on this Sno-Plow write for catalog to nearest address, Box PW 5311



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6 Essential Facts

for a city with a Water Problem ... and a Budget Problem, too!

1. Costs Far Less to Install!

- A Ranney Water Collector will add millions of gallons to your daily water supply—at a fraction of the cost of conventional systems!

2. Less Expensive to Operate!

- A Ranney Water Collector is far less expensive to operate—uses fewer pumps, fewer personnel, less power, and usually requires no treatment facilities.

3. Maintenance Requirements Practically Nil!

- A Ranney Water Collector requires little or no maintenance. The rate of flow through the Ranney Collector's apertures eliminates clogging and silting. No filter plant maintenance.

4. More Water per Unit!

- A single Ranney Water Collector has produced more clear, cool water than ten conventional vertical wells.

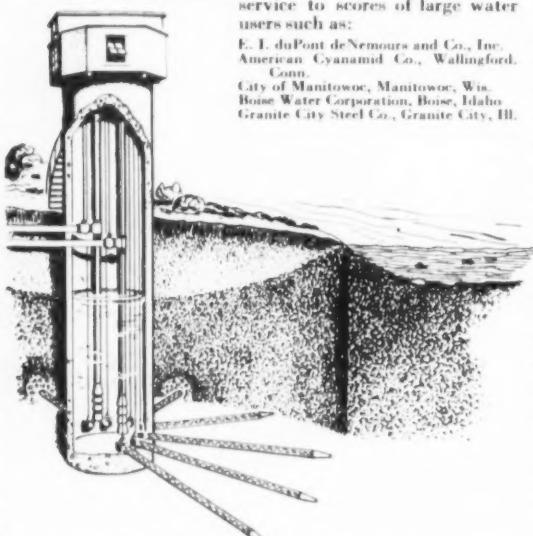
5. Far Longer Life Cuts Depreciation Costs!

- The longer life of a Ranney Water Collector lowers financing and depreciation rates appreciably.

6. Ask These Satisfied Users

- Ranney Water Collectors are currently rendering excellent service to scores of large water users such as:

E. I. duPont deNemours and Co., Inc.
American Cyanamid Co., Wallingford,
Conn.
City of Manitowoc, Manitowoc, Wis.
Boise Water Corporation, Boise, Idaho
Granite City Steel Co., Granite City, Ill.



An inexpensive Ranney survey will determine how the Ranney Method can work for you.

If you need water, write us for complete information on how a Ranney Water Collector will solve your problem.

Ranney Method Water Supplies, Inc.

HYDROLOGISTS AND WATER SUPPLY CONTRACTORS

Executive and Engineering Offices

Dept. B-11, P. O. Box 277, Columbus 9, Ohio

All but a few test materials were penetrated when a gnawing edge was exposed.

Without gnawing edges, some materials were penetrated in 1 to 8 nights. Others were penetrated in about the same length of time, but required a gnawing edge. Some of the harder materials and heavier-gauge aluminum alloys required 34 to 126 nights' exposure with a gnawing edge. The hardest grades of asbestos cement and metal base plates of sheet iron withstood up to 122 nights of exposure without penetration or serious damage.

It was concluded that not one of the materials was absolutely ratproof, but that composition building materials in the harder grades of asbestos cement products could be made relatively ratproof by protecting construction joints or other raw edges and by protecting the material itself in easily accessible areas.

Aluminum alloys were quite easily penetrated except for the harder tempers in the thicker sheets. Aluminum sheet material used as construction facing should be protected at all raw edges, preferably by sheet iron. Although aluminum alloys shaped as door channels withstood gnawing exposure considerably longer than the same alloys exposed as plain sheets, they are not considered suitable replacements for galvanized sheet iron as protective door channels. Public Health Reports.

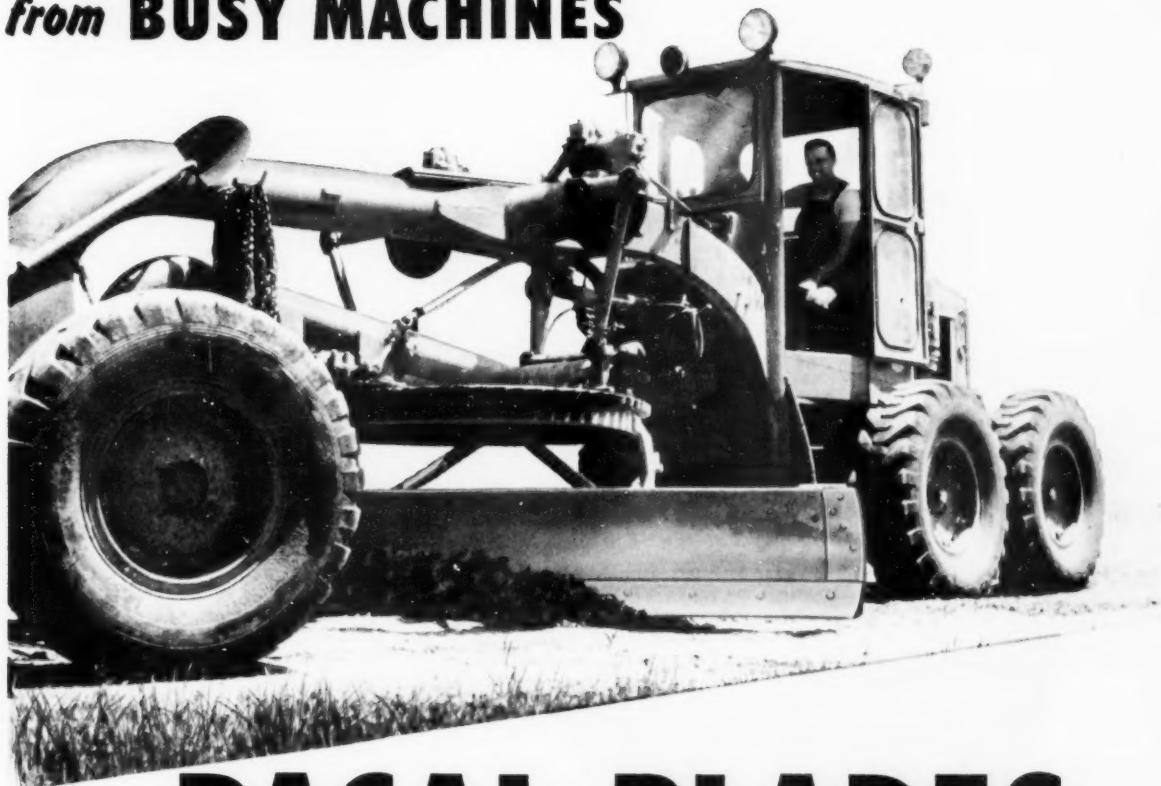
Incinerator Operation Good at Baltimore

Baltimore continued to dispose of mixed refuse by incineration at the Reed Bird Avenue incinerator. Early in 1952 mechanical stokers were installed in the Reed Bird Avenue incinerator to facilitate handling refuse at the plant. The installation of these stokers made it possible to incinerate refuse in excess of the 600-tons per day rated capacity. A total of 179,766 tons of refuse was destroyed during 1952. The average daily destruction of refuse was 576.2 tons, based on a 24-hour, six-day week operation. The increase in the amount handled during 1952 compared with 1951 was 9.55 percent. The average daily destruction of refuse for 1952 was 96 percent of the rated capacity. Smoke density for each month was less than #1 on the Ringlemann chart. Total cost of operation was \$300,892.12, revenue from salvage was \$28,067.70, giving a total net cost of \$272,829.40 or an operating cost of \$1.52 per ton. These data are from the State's Division of Sanitary Engineering.

Test Data on Sewage Sludge Filtration

A series of tests were run at the Columbus, O., sewage treatment plant during April and May, 1953, using a Komline-Sanderson "Coil-filter." The sludge is described as "typical plant digested activated sludge." Ten tests were run, all of 30 minutes duration. Percent of solids in the sludge varied from 4.6 to 5.8. Ferric chloride dosage varied from none to 3 percent and lime from 3 to 13 percent. Best results were obtained with Run No. 7. Sludge solids were 5.1 percent; ferric chloride dosage was 1.5 percent and lime 6 percent. The filtrate contained 752 ppm total solids and the moisture content of the filtered sludge was 67.1 percent. The rate of filtration was 6.9 pounds of dry solids per square foot of filter per hour with a drum speed of one revolution in 7 minutes. Other runs produced higher rates of filtration but, for the Columbus sludge, the dosages given appeared most efficient.

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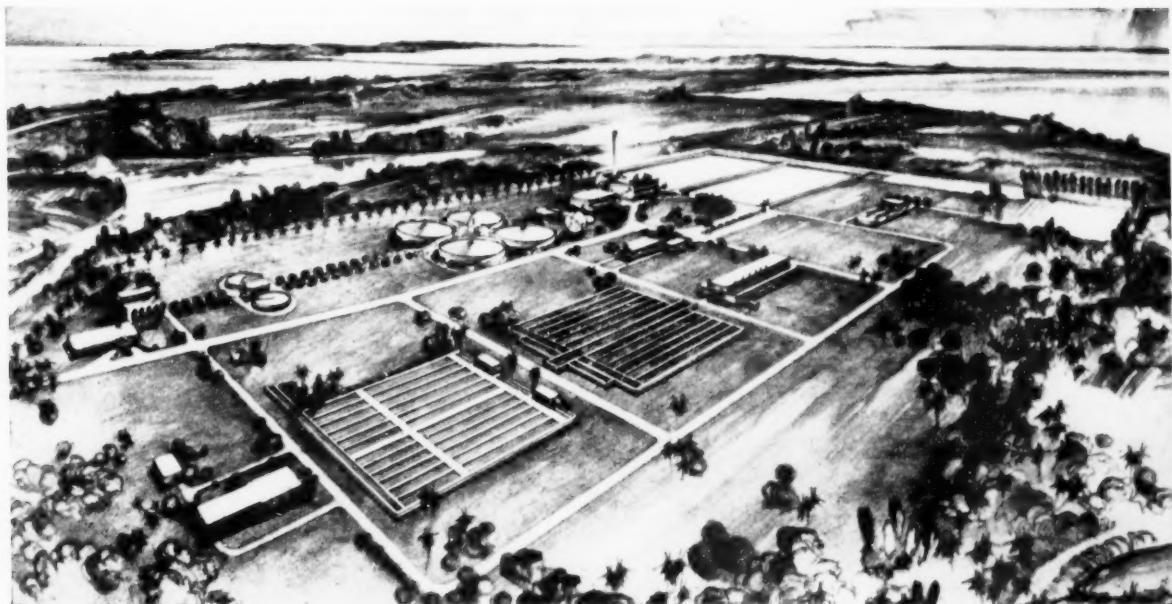
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The City of Chicago recently required 14 special type bucket machines with "height extensions", allowing the load to be emptied directly into the dump truck. "Flexibles" was its choice. Pictured above are these "made-to-order" machines just prior to leaving the Flexible plant in Lima, Ohio. We have, or can "tailor", equipment required to meet your city's special needs. Write for FREE CATALOG.

THE LEADER IN SEWAGE SLUDGE DISPOSAL

specified for Miami Project

Two C-E Raymond Incinerators will be used at Miami's new sewage treatment plant, located on Virginia Key, just across Biscayne Bay from Miami proper. Treatment plant design was by Metcalf and Eddy, a member of Miami Sewer Project Associates. Other members are Rader Knappen Tippets Engineering Co. and Maurice H. Connell & Associates, Inc.



In keeping with the thoroughly modern equipment to be used in this new plant, the filtered sludge will be processed in two C-E Raymond Flash Drying and Incineration Systems. The sludge will be dried from 75% to 8% moisture, and then incinerated to a sterile ash. High-temperature deodorization will eliminate odors from the stack gases. Each C-E Raymond Flash Dryer will process 4½ tons of filter cake per hour, which is equivalent to an evaporation rate per unit of 6,576 pounds.

The system can be easily adapted to the production of fertilizer by the addition of dried sludge handling equipment. This flexibility is just one of the many reasons why the aggregate capacity of C-E Raymond Equipment installed, under construction or on order, is higher than all other heat methods combined.

What has been right for so many other communities will be right for you, too. Let a C-E Raymond specialist demonstrate how efficiently and economically this leading system can end your sludge disposal problems.



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NEW LISTINGS

Complete Data on Sludge Pumps and Contractors Pumps

178. An easy-to-use reference bulletin covering the full line of Marlow pumps for municipal and industrial wastes includes performance information, specifications and selection data for plunger sludge pumps, mud-log diaphragm pumps and self-priming centrifugal pumps used on sludges and slurries. Get your copy by writing Dept. PW, Marlow Pumps, Ridgewood, N. J.

Factors in Selecting Chlorine Gas Feeders for Sewage Chlorination

181. A technical data sheet, number 840-JM, has been prepared as a guide in the application of chlorine for sewage treatment. The purposes of sewage chlorination, types of chlorination, points of application, control methods, types of feed and feeders and equipment location are discussed. Check the coupon or write to Builders' Providence, Inc., 345 Hayes Ave., Providence, R. I.

Get Full Data On the Radar Speed Meter

189. Accurate readings of vehicle speeds, with direct indications in miles per hour and a graphic recorder for permanent record are available by use of the Electro-Matic Radar speed meter, a product of Automatic Signal Division, Eastern Industries, Inc., Norwalk, Conn. For full data on this device, last check the coupon.

What You Should Know About Rotary Distributors

199. An authoritative discussion of size, tributaries to loss and high-rate filtration at municipal and industrial waste treatment plants has been presented in a 20-page booklet by the Dorr Co., Engineers, Barrs Pt., Stamford, Conn. Unit sizes range from 20 to 200 ft. diameter and capacities from 60 to 27,000 gpm. Trickling filter processes and aeration, design features, hydraulic and mechanical factors and other related material are covered fully in this helpful booklet. Check the coupon for your copy.

The engineering information in these helpful catalogs will aid you in your Engineering and Public Works programs. Just circle numbers you want on the coupon, sign and mail. This free Readers' Service is restricted to those actively engaged in the public works field.

How Tunnelers Revolutionize Underground Sewer Construction

205. The Tunneliner method of underground sewer construction places full ring sections at present, oval shape reinforced concrete pipe as excavation progresses, thus providing a full-strength structure right up to the working face. Available in 33" through 72" sizes, the job is done with equipment which may be rented at a nominal charge. You can get full information on this method by writing Lamar Pipe and Tile Co., Grand Rapids 9, Mich., or by checking the coupon.

Get Latest Data On Collecto-Pak Units



243. A feature-packed, two-color bulletin telling all about the Collecto-Pak garbage collection unit has been issued by the Heil Co., Milwaukee, Wis. Action photos and cutaway views show the ease of loading and unloading and illustrate the effective compacting arrangement that means bigger loads and lower costs. Get the full story by checking the coupon.

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11-53

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213. The Hauck double jacketed melting furnace uses L.P. gas as fuel and a high flash point oil for heat transfer to assure close temperature control when melting rubberized joint sealers of all types. All details on this 16-gallon capacity unit are furnished in Bulletin 1081. Check coupon for your copy. Hauck Mfg. Co., 124 10th St., Brooklyn 12, N. Y.

Helpful Data on Venturi Type Meters

221. The Simplex type MO Meter for measurement of water, sewage, sludge and industrial liquid flows over wide ranges, is featured in an information-packed bulletin, No. 200, issued by Simplex Valve & Meter Co., Philadelphia 42, Pa. Get this bulletin for data on operation, construction, accuracy, primary devices and other information of interest to engineers who deal with fluid flow problems. Check the coupon.

New Construction Technique For Reducing Road Glare

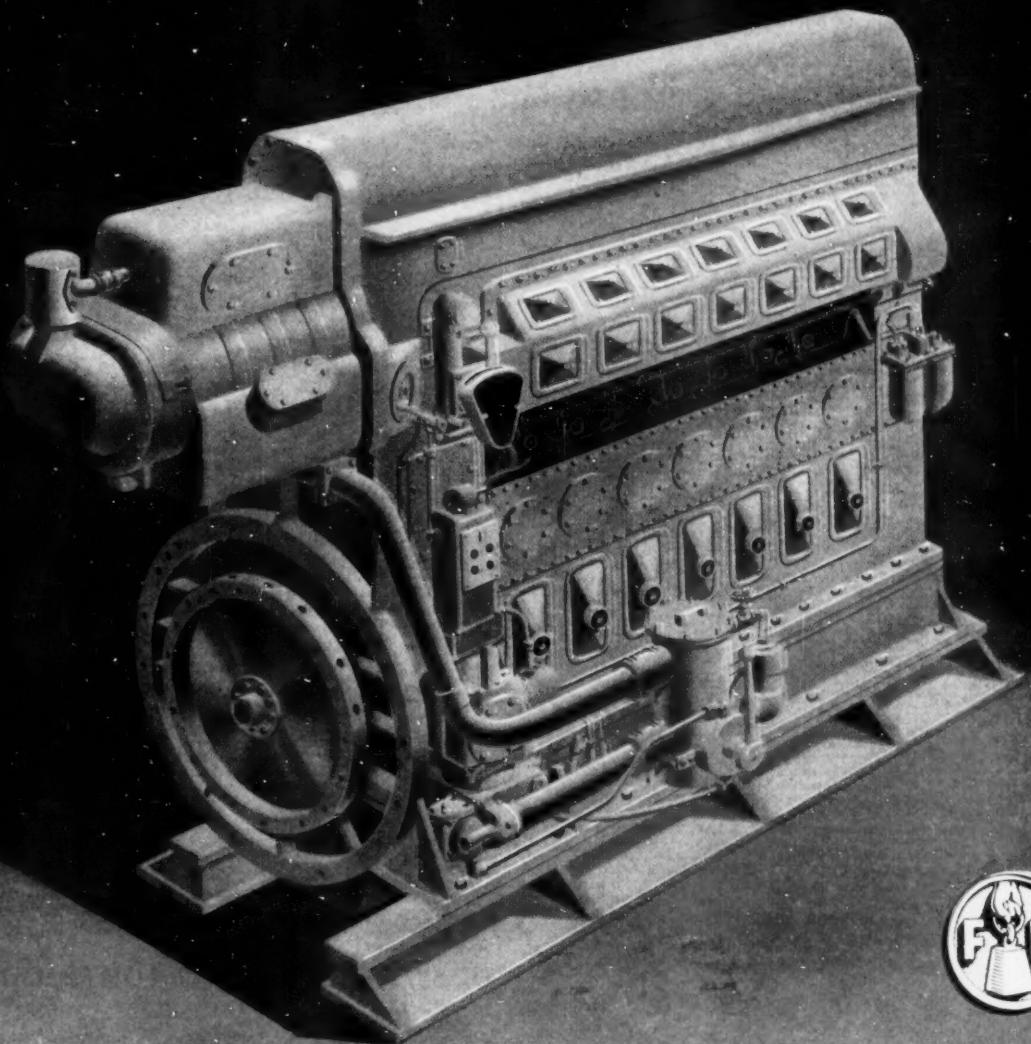
238. Road glare reduction is easily obtained by darkening concrete, but ordinary carbon blacks adversely affect the air-entraining agents used so extensively in today's concrete construction. It will be of much interest to all road builders to learn that A. C. Hart Co., 10th St. & 4th Ave., Long Island City 1, N. Y. now offer AF Dispersed Black, a material which will not neutralize the air-entraining agents. A postage folder giving full data is available. Check the coupon for your copy.

General Catalog Shows Water, Sewage and Trade-Waste Treating Equipment

240. Handling equipment for treating water, sewage and trade wastes include circular and rectangular clarifiers, automatic backwash rapid sand filters, hydro-classifiers, flocculating units and digesters. Many of these units are illustrated and their features described in new Bulletin AH-443, issued by Hardinge Co., Inc., 249 Arch St., York, Pa. Be sure to check the coupon for your copy.

Data on Porous Media For Water and Sewage Treatment

206. Full data on Filtris, a strong, acid-resistant porous ceramic material available in plates or tubes for activated sludge aeration and water filtration, is presented in a 12-page booklet by Filtris, Inc., East Rochester, N. Y. Physical and chemical properties, shapes, sizes and grades, application, installation and operating data are covered in detail. Check the coupon for your copy of Catalog No. 10.



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To order these helpful booklets check the coupon on page 36.

8 Reasons Why You Should Check the Jaeger Loader

207. In a profusely illustrated, 16-page catalog devoted to the applications and special design features of the Jaeger "Load-Plus" tractor loader unit, eight good reasons listed to back up the claim that this machine out-produces any other loader of its size. These include load capacity, balance, reach, maneuverability, automatic power adjustment by torque converter, instant reversal, multiple speed and ease of control. Check them all by getting a copy of Catalog L-100. Check the coupon today. Jaeger Machine Co., 400 Dublin Ave., Columbus 15, Ohio.

Clarification of Water By Filtration

245. Dicalite filterads have wide application for reclamation and recycling in industrial processing, prevention of pollution in waste disposal and purification of domestic and industrial potable supply. 24-page Technical Bulletin B-12W, issued by Dicalite Div., Great Lakes Carbon Corp., Los Angeles 14, Calif., gives detailed descriptions of these filterad uses and provides typical flow diagrams. Get this helpful reference by checking the coupon.

Fire Pots and Torches For Shop and Field

254. For convenience and high-speed melting efficiency, be sure to check the Turner fire pots and torches. Burn liquefied petroleum gas, no regulator required, clean and economical. For full data check the coupon. Turner Brass Works, Sycamore, Ill.

The Story of Precast Concrete For Sewers, Drainage and Bridges

255. The dynamic growth record of American Marietta Co. is portrayed in this firm's 1953 Semi-annual Report of Progress. Get your copy and see how expanded production of precast concrete sewers and drains, "Tunneline" pipe sections and prestressed bridge sections help designers and engineers get quicker, better service. Write Dept. CP, American-Marietta Co., Chicago 11, Ill., or check the coupon.

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What You Should Know About Trickling Filter Underdrains

20. Specifications for vitrified clay underdrain block, conforming to ASTM standards, suggestions for layout and construction of trickling filter floors, dimensions of standard blocks, channel covers, angles and other fittings are available from the Trickling Filter Floor Institute, c/o Editor, Public Works, 310 E. 45th St., New York 17, N. Y. Check the coupon and we will forward your request.

Valuable Booklet on Porous Diffuser Plates and Tubes

21. A helpful 20-page booklet published by the Norton Co. is a complete guide for the selection of porous media for installation in activated sludge plants. Full data for the designing engineer is provided by careful detailing of physical characteristics of plates and tubes. Maintenance of porous media also is discussed at some length. For your copy of Form 1246 write the Norton Co., Dept. PW, Worcester 6, Mass., or use the coupon.

Useful Data on Butterfly Valves

100. Complete descriptions and tables of dimensions on the full line of Rockwell Butterfly Valves is contained in several bulletins published by the company. Construction details and special control features are illustrated. Write W. S. Rockwell Co., 200 Eliot Street, Fairfield Conn.

Low Cost Power From Dual Fuel Engines

154. Operating on the Diesel cycle, burning either oil or gas, the Worthington Supercharged Dual Fuel Diesels give high economies by running on the cheapest fuel available. Get complete data from Worthington Corp., D. W. PW, Harrison, N. J.

A Handbook of Sewer Cleaning Methods and Materials

44. Complete, easy-to-follow directions for every type of sewer cleaning operations and the equipment needed for effective cleaning work is covered in a 40-page booklet issued by Flexible Sewer-Rod Equipment Co., 9059 Venice Blvd., Los Angeles 34, Calif. Full details are provided on power cleaning machines, the SewerRodier, hand tools and all accessories. Water main and culvert cleaning methods are included. Check the coupon for your copy of this helpful handbook.

Helpful Design Data For Sewage Ejectors

81. The applications and advantages of pneumatic sewage ejectors are outlined in a new bulletin of the Blackhurn Smith Mfg. Co., Inc., Hoboken, N. J. Included are piping diagrams for electrode and float switch controls plus dimensions and layouts for single and duplex systems. Get your copy by checking coupon.

Data Offered On Mixed Flow Pumps

201. Data on the complete line of Worthington Mixflo pumps of the two-vane, non-clogging sewage type is offered in 16-page bulletin W-317-H16. Salient features are outlined, typical sections, performance curves and general data for five types are included. Helpful charts aid shafting selection. Copies available by using coupon or from Worthington Corp., Harrison, N. J.

Instrumentation and Control Equipment For Water and Sewage Plants

298. Full engineering data on the instrumentation and control equipment needed in water works, sewage plants, pumping station and related installations are provided in the "Application Engineering Data" binder issued by the Foshco Co., Woburn, Mass. Every engineer and designer should have this valuable material on hand. Check the coupon if you can use this data.

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A Lessmann digs even frozen aggregate, sand, coal . . . takes a ton bite with a $7\frac{1}{2}$ ton forward thrust *while unit is standing still!* High clearance permits Lessmann to load largest trucks as shown in illustration above. Engine, transmission, driving axle, hydraulic system and brakes are STANDARDIZED PARTS . . . Ford, Timken, Vickers, Benda.

All weather cab, Vickers Power steering and Benda Hydro-Vac Brakes are available as optional equipment on all three models. Write for free folder giving complete information.

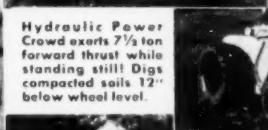
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With dozer blade, the Lessmann grades, maintains roads . . . back fills on construction and sanitation projects.



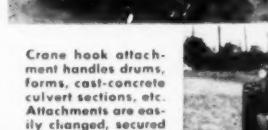
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Crowd exerts $7\frac{1}{2}$ ton forward thrust while standing still! Digs compacted soils 12" below wheel level.



Snow or trash bucket
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Lessmann Manufacturing Co.

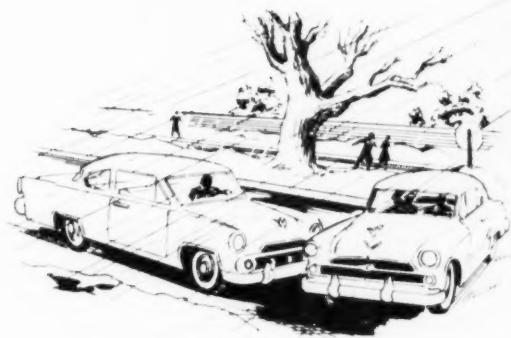
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"PULL THE TRIGGER" ON OL' MAN WINTER!



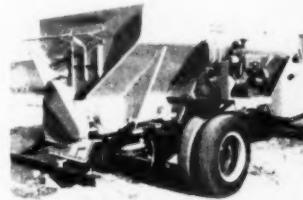
Heres Real Help for the "General Staff" of any Community, large or small. "Know-How" for Your Winter Campaign against Ice & Snow

HANDLING CALLS from irate voters after winter storms are real headaches. And straightening-out traffic tangles takes up lots of time. Here's where Hi-Way's Ice Control Method fits into your picture. It's simple . . . it's inexpensive . . . it makes year 'round good sense! With Hi-Way Spreaders, there's no waste materials . . . they all go where they're needed most . . . in uniform quantities. You'll find manpower goes further, too, as one man handles a spread job himself; other methods often took 2 or 3. And there are no costly breakdowns. You'll find that Hi-Way Spreading Equipment does your job faster . . . making more miles of highways and streets safer per hour. They perform at speeds up to 35 MPH., spreading uniformly at any in-between-speeds.

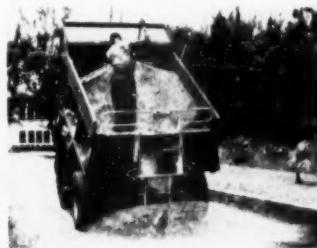
When storm forecasts come in, your trucks can be ready-loaded for action. All you need do is call out the driver. And best of all, Hi-Way equipment is versatile. There's no summer idle period. It can be equally as efficient for seal coating, road stabilization and dust control with sand, stone, chips, rock salt or calcium chloride. Your job will be easier with Hi-Way . . . the results more satisfying . . . the cost less . . . with added safety. Irate voters become happy voters, impressed with your good judgment.



HI-WAY MODEL W—"SPREAD-ALL" designed and engineered for heavy-duty, year 'round spreading. Available in 7 $\frac{1}{2}$ to 12 $\frac{1}{2}$ cu. yd. capacities. Spreads any width from 4' to 70'.



HI-WAY MODEL E—all-purpose truck-mounted, self-unloading spreader, power-take-off or separate motor drive. 4 $\frac{1}{2}$ to 7 $\frac{1}{2}$ cu. yd. capacity.



HI-WAY MODEL DD—an all-season, low-cost portable tail gate spreader mounts on standard dump body, quickly, powered by rugged gas engine.

HIGHWAY EQUIPMENT CO. Inc.

645 D Avenue N. W., Cedar Rapids, Iowa

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Demonstration



MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF
SPREADERS AND BULK MATERIAL DELIVERY EQUIPMENT

To order these helpful booklets check the coupon on page 36.

Technical Data Offered on The "Barminutor"

156. The Chicago Pump "Barminutor" which combines a bar screen with a vertically traveling Commutator unit is now available for flows of 15 MGD and over. Units are readily installed in existing open channels. Get full technical data from the Chicago Pump Co., 622 Diversey Pkwy, Chicago 14, Ill.

Design Data for Insulated Piping

188. For all jobs where insulated piping is required you will want full design data on Ric-wil. Prefabricated Insulated Piping. Get 28-page catalog from the Ric-wil Co., Barberston, Ohio, for details on both underground and overhead lines.

How Vacuum Filters Help Your Sewage Sludge Disposal

209. Applications of the Conkey sludge filter to all types of sewage sludge are described in Bulletin 100. Tables show filter sizes, weights, and give anticipated average results. Use the coupon to order your copy. General American Transportation Corp., Process Equip. Div., New York 17, N. Y.

Efficient Blowers for Activated Sludge Plants

232. Many advantages of Roots-Connerville positive displacement rotary blowers are described in Bulletin 22-23-B-13, which also provides characteristic curves for operation with constant speed, multi-speed and variable speed motors and details of several types of blowers. Get this helpful bulletin by checking the coupon. Roots-Connerville Blower Corp., Connerville, Ind.

Book Tells How to Control Root Stoppages

249. Details on the proven use of copper sulfate to control root and fungous growths in sewers are contained in a brand-new book published by Phelps Dodge Refining Co., 40 Wall St., New York 5, N. Y.

For prompt catalog service always use the PUBLIC WORKS reply card or coupon.

Design Data on the Circuline Sludge Collector

237. All the information you need for the design of circular settling tanks using the Link-Belt Circuline sludge collector will be found in 20-page Book No. 1982, published by Link-Belt Co., P.O. Box 472, Lansdale, Pa. Capacity tables, suggested sizes for all piping and design details are included. Check the coupon for your copy of this valuable booklet.

Helpful Data on Bermico Pipe Fittings

262. Data are now available on fittings for use with Bermico sewer pipe and perforated pipe-T's, Y's and bends to make complete root-proof, water-tight, corrosion-resistant Bermico pipe systems. Get full information by checking the coupon. Brown Co., 150 Causeway St., Boston, Mass.

How to Dispose of Sewage and Industrial Sludges

281. Get full information on the C. E. Raymond System of combined incineration and sludge drying providing high temperature deodorizing for nuisance-free sludge disposal. Flexible layouts fit large and small communities. Use handy coupon or write Combustion Engineering Inc., Flash Dryer Div., 200 Madison Ave., New York 16, N. Y.

Using Sewage Sludge Gas For Power Generation

290. Fairbanks-Morse dual fuel engines can operate on either sludge gas or oil to provide steady power output despite fluctuations in gas supply. Bulletins are available on several sizes to meet your needs. Write, giving exact requirements to Fairbanks, Morse & Co., Dept. PW, 600 So. Michigan Ave., Chicago 5, Ill. or use handy coupon.

Theory of Controlled Digestion With Floating Cover Tanks

288. In an excellent 40-page booklet, an authoritative discussion of digestion theory and practices, including design, operation and economics is presented by the Pacific Flush Tank Co., Chicago 13, Ill. Complete data are given on the use of floating covers, together with details on tank construction, piping and control chambers. Requests for this valuable booklet must be made on business letterhead.

Have You Heard About Bionetics For Sewage Treatment?

350. Bionetics, a dry staple powder of groups of living organisms preserved with enzyme systems, is available in several types to improve and accelerate the biological processes performed at sewage treatment plants. Get full data from Reliance Chemicals Corp., Box 6724, Houston 5, Texas. Just check the handy coupon.

BUSINESS AND ADMINISTRATION

Booklet Outlines

Scheduled Preventive Maintenance

223. An interesting case history on reduction of equipment failures and less "downtime" through scheduled preventive maintenance is offered by Remington Rand Inc., Management Control Library, 315 Fourth Ave., New York 10, N. Y. Ask for Folder K666 or check the handy coupon for your copy.

Two-Way Radio Equipment For All Departments

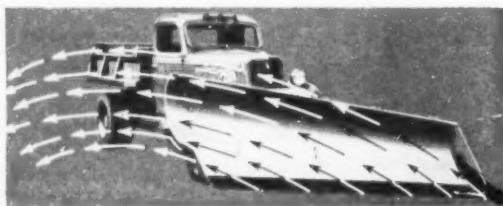
293. The benefits of two-way radio communication in the uncongested non-interference 450-megacycle range make full information on this subject important to all engineers. Get full data on trouble-free systems from Motorola, Inc., Dept. PW, 4545 Augusta Blvd., Chicago 51, Ill. Just check the coupon.

For Easiest Snow Removal Specify BURCH-BUILT Equipment

Features on "Burch-Built" ROSS Snow Plows which assure more efficient snow removal are:

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ROSS SNO-FLO DESIGN ELIMINATES SIDE DRAFT

Thrust is equally distributed at both sides of moldboard, thereby allowing easy steering in deep snow. Conical shape of Ross moldboard offers least resistance in compact snow.

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**How Aerial Surveys
Fill All Map Needs**

235. A clear explanation of the technique of aerial topographic map production is given in "Air Speeds Your Map Needs." Striking photographs trace aerial photos step-by-step to the final maps for highway location, city and regional zoning and planning, traffic studies, drainage and watershed projects, tax maps and many other types of work. Use the coupon to get this excellent booklet for public works and planning officials. Jack Ammann, Photogrammetric Engineers, 829 N. St. Mary's St., San Antonio 2, Texas.

WATER WORKS

**Head Loss Data
On Plastic Pipe**

26. Carlon Products Corp., 10225 Meech Ave., Cleveland 5, Ohio, announces that authoritative data has been compiled on head loss due to friction in Carlon plastic pipe and is available in the form of graphs and charts. The graphs show superior flow characteristics, attributed to the fact that plastic pipe is not "wetted" by water. Send for this data today by using the handy coupon.

**Efficient Coagulation
With Ferri-Floc**

69. Advantages claimed for Ferri-Floc as a coagulant include wide pH range, quick floc formation, manganese removal, control of certain tastes and odors, plus other aids in high quality water production. Check coupon for complete Ferri-Floc data. Tennessee Corp., Grant Bldg., Atlanta, Ga.

**96 Page Book Helps Solve
Water Problems**

71. pH and Chlorine Control. A discussion of pH control and description of comparators, colorimeters and similar devices. A 96 page booklet. W. A. Taylor & Co., 7304 York Road, Baltimore 4, Md.

**Floatless Liquid
Level Controls**

92. Complete descriptions of electrode type floatless liquid level control systems, including control units, electrodes and fittings, panel assemblies and diagrams of typical installations for all types of municipal service are covered in the 32-page catalog of Charles F. Warrick Co., 1956 W. Eleven Mile Rd., Berkley, Mich. Check coupon for your copy.

**Methods of
Chlorinator Control**

98. Chlorinator control methods include manual, semi-automatic, program, rate, fully automatic proportional and split feed control. To assist the chlorinator user and his engineer or technical adviser in the selection of the control method best suited for each requirement, a publication of Wallace & Tiernan, Inc., describes these methods in detail. You can get a copy of Publication TA-1013 C by checking the coupon.

Tested Jointing Materials

102. "Hydrotite" is a self-caulking, self-sealing joint compound for bell and spigot pipes. For data book and sample write Hydraulic Development Corp., 50 Church St., New York, N. Y.

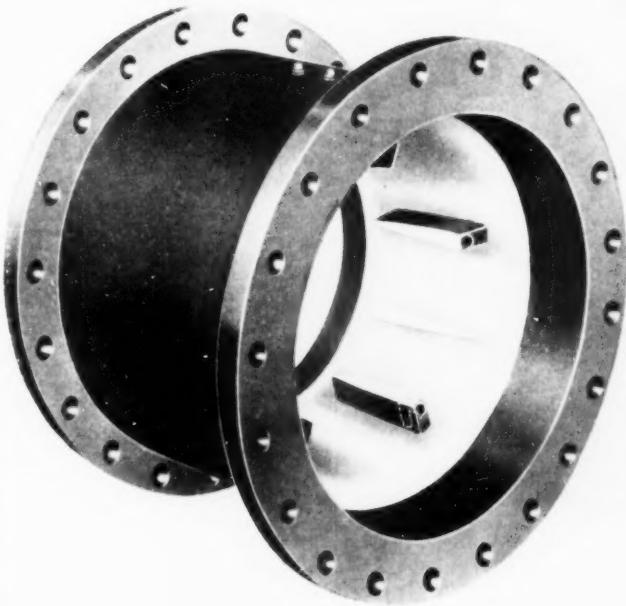
**Pressure Pipe That
Retains Capacity**

106. Several bulletins describing the construction of pressure pipe, list of installations, carrying capacity tests, making service connections under pressure, and detail descriptions of several installations. Lock Joint Pipe Co., Box 269, East Orange, N. J.

**Makes Underground Pipe
Installations Easy**

115. One-man operated hydraulic pipe pusher pushes pipe through ground under streets, sidewalks, lawns and other obstacles. Pays for itself in man hours saved on first few jobs. For complete facts ask for Form E-213, Greenlee Tool Co., Rockford, Ill. Just check the coupon.

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Flow Tubes offer economies all through their long service lives.

First cost is low. Installation costs are low, too, because Flow Tubes can be installed inside the plant. They are short, compact, and require only minimum straight runs entering and following. No expensive vaults are needed.

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That's why Flow Tubes are being successfully used in scores of installations metering the flow of liquids and wet or dry gases. Available in all pipe sizes and suitable metals. They can be furnished with or without suitable secondary indicating, recording or totalizing instruments. For further information, write for your Flow Tube Data File. For specific recommendations, send us necessary flow data.



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FOSTER ENGINEERING COMPANY • UNION, N. J.

To order these helpful booklets check the coupon on page 36.

How Accurate Boring Speeds Underground Pipe Installations

135. Interesting charts showing earth boring costs, speed and accuracy for holes from $2\frac{1}{2}$ " to $14\frac{1}{2}$ " diameter and up to 80 feet long are included in 16-page Catalog No. 8 issued by Hydraulics Corp., 681 Market St., San Francisco 5, Calif. Specifications and general operating instructions are also covered.

How Your Filter Washing Can Be Improved

136. More thorough sand washing with the elimination of mud balls and cracking with resultant longer filter runs are claimed for the Palmer Filter Bed Agitator, described in bulletin issued by the Palmer Filter Equipment Co., P. O. Box 1655, Erie, Pa.

Helpful Data on Mechanical Joints

138. Get Circular 49 from M & H Valve & Fittings Co. for important information and installation dimensions of M & H AWWA Mechanical Joint Valves and Hydrants. Features include ease of installation, construction economy, long life. Use coupon or write M & H Valve & Fittings Co., Anniston, Ala.

Engineering Data on Diatomite Filters

139. Get complete data on the Sparkler model SCJ diatomite slurry feed filter for swimming pools from the Sparkler Mfg. Co., Mundelein, Ill. Check the coupon for full information including table of filter sizes and capacities, space required and filter operation.

Pipe-Laying Instruction Booklet Is Easy to Read

149. A new pipe-laying instruction booklet, written in straightforward language, explains every operation in laying concrete pressure pipe. "How-to" photographs and simplified diagrams show just how the job should be handled. Get copies of this 16-page booklet from Price Brothers Co., Dayton, Ohio, by checking the coupon.

Discussion of Ranney Method For Municipal Water Production

116. A very interesting study of municipal and industrial water supply problems and a complete discussion of Ranney Collectors for water production will be found in a 20-page booklet published by Ranney Method Water Supplies, Inc., Box 277, Columbus 9, Ohio. Water quality, construction methods, costs, performance and other topics are considered. Check the coupon to get your copy.

Pipe Detector Determines Exact Location and Depth

120. Determination of the exact location and depth of buried pipes, valves, service cables and other metallic objects can save costly digging and unnecessary damage. Your work can be speeded when you use the Detectron pipe detector, which features simple operation, shielding to avoid static interference, economical unit construction and a lifetime guarantee. Get full data from Detectron Co., 5631 Cahuenca Blvd., No. Hollywood, Calif., by using the coupon.

What You Should Know About Steel Reservoirs and Standpipes

163. In a handsome 24-page booklet, "Hutton Steel Reservoirs and Standpipes," the Chicago Bridge & Iron Co., Chicago 4, Ill., shows installations from 50,000-gal. to 10,000,000-gal. capacity with several types of roof and special architectural features. Engineering data includes information on capacities, foundations and improved surface protection. Check the coupon to get your copy.

What You Should Know About Meter Setting and Testing Equipment

166. Complete details on all equipment and proper methods for meter testing and installation are included in an excellent book published by Ford Meter Box Co., Wabash, Ind. All waterworks men concerned with setting and testing of water meters should have a copy of this book. Write for Catalog No. 50.

Inserting Valves Without Shutdown

162. Do you have the latest data on equipment for inserting control valves where shutdown is impractical? Mueller catalogs H-20 and H-602 give all details on inserting valves and equipment, using hand-operated or power-operated machines. Get these catalogs today by checking the coupon. Mueller Co., Decatur, Ill.

Avoid Needless Digging With This Valve Box Locator

165. Convenience and accuracy are key notes of the Aqua Valve Box locator described in a full-color folder offered by Aqua Survey and Instrument Co., 2518 Leslie Ave., Cincinnati 12, Ohio. Cobalt-alloy steel dipping needle is factory-set for any geographic location. Peep-hole type mirror arrangement permits effortless top reading. Get full details by checking the coupon.

Pipe Joint Essentials and Couplings for Every Job

168. Superior pipe joints are tight, flexible, simple, strong and economical. Dresser's handsome 34-page bulletin No. 513 shows how these essentials are met and provides layouts for curves, working pressures and a wealth of other data. Be sure to check this bulletin on the coupon. Dresser Mfg. Div., 59 Fisher Ave., Bradford, Pa.

Porous Media Handbook For Sanitary Engineers

222. A really helpful 56-page booklet just published by the Carborundum Company tells the complete story of the use of porous media in the fields of water and sewage treatment. The major portions are devoted to water filtration and air diffusion for activated sludge treatment. Diagrams show the many installation methods used, and full data is provided for the designing engineer. General data and specification sections complete this valuable reference bulletin. Get Form 5118 by checking coupon or write The Carborundum Co., Refractories Div., Perth Amboy, N. J.

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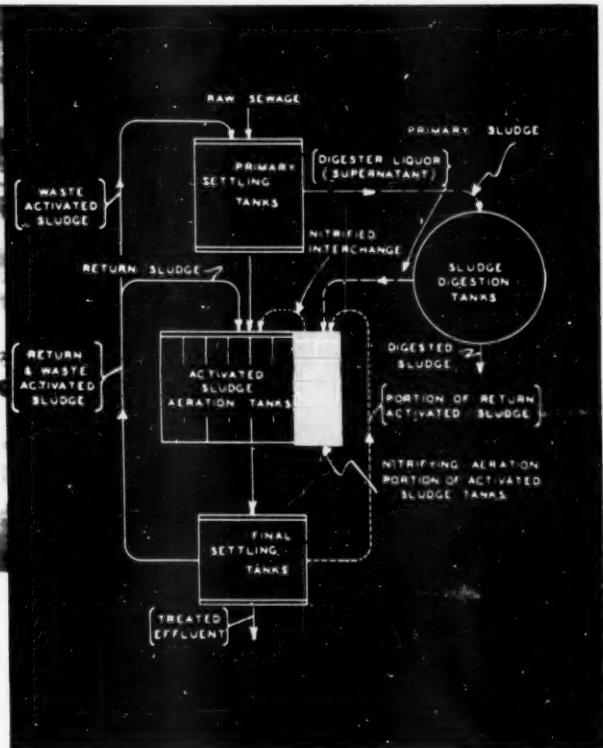
In St. Joseph—Benton Harbor, Mich. . . .

this activated sludge plant to handle heavier seasonal loads with the "PFT KRAUS PROCESS"

In the design of the sewage treatment plant for the sister cities of St. Joseph and Benton Harbor for a population of 50,000 the engineers were confronted with a heavy load increase in summer—10,000 additional visitors, plus the equivalent of 25,000 in wastes from local canneries. *The problem was to handle an increased load of 70% during peak summer months.*

Solution—the "PFT Kraus Process", a new method of interchange to handle this heavier load *without* additional aeration basins, aeration facilities or appreciable greater amount of air. The increased load is handled by the "Kraus Process" method of piping and sludge pumping, and by making effective use of digestor liquor in the main treatment process.

How the process works—As shown in the diagram, a portion of the aeration tanks are set apart for nitrifying aeration. Digestor liquor or digested sludge, or a mixture of both, is then added to the nitrifying tank. The ammonia nitrogen in the digestor liquor or sludge is converted to nitrites or nitrates. This produces highly nitrified solids which are then returned to the remaining activated sludge aeration tanks. This process aids the entire waste treatment operation in two ways:



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The highly nitrified sludge may be returned continuously to the normal activated sludge process or may be returned only when needed to overcome shock loads of organic matter.

Pacific Flush Tank has the exclusive rights for licensing this process and will supply immediate data and recommendations on request. Other plants now operating with the PFT Kraus Process include: Peoria, Ill., Rochelle, Ill., Durham, N.C., Woodstock, Ill.

Other PFT equipment installed in the new plant: 3 Floating Covers to fit 80' Diameter Digestors; 2 Heater & Heat Exchanger Units (750,000 B.T.U./hr.); 3 Cover Position Indicators; Supernatant Selector and Gauge; 6 eight inch Rotary Sludge Withdrawal Valves; Gas Safety Equipment.

*Design \ Consoer, Townsend & Associates
of plant by \ Chicago, Ill.*



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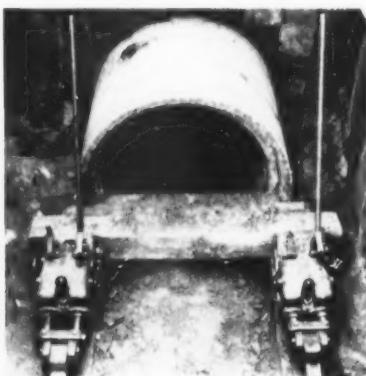
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PUSH PIPE UNDER STREETS, TRACKS, walks, floors and other obstacles with a GREENLEE Hydraulic Pipe Pusher. One-man-operated, portable, simple to operate. No tearing up of pavement . . . eliminates extensive ditching, tunneling, back filling, ramping, repaving. Cuts job time to a fraction. GREENLEE Hydraulic Pipe Pusher often pays for itself on first job. Two sizes model shown above for pushing $\frac{1}{4}$ to 4" pipe. Larger unit, below, for pipe over 4", concrete sewer pipe and large drainage ducts. Power pump also available for extra ease and speed of operation.



Write today for descriptive literature. Greenlee Tool Co., 2051 Columbia Avenue, Rockford, Illinois, U.S.A.

Specs for Gate Valves

112. Rigidly inspected gate valves for pressures up to 175 lbs. by R. D. Wood Co. Sizes 2" to 30", for any standard type joint. R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa.

Engineering Data On Gravity Filter Design

170. The complete line of gravity filters and related accessories furnished by the Permuti Co., New York 36, N. Y., is covered in a well-illustrated 24-page booklet. Each element of a filter and filter controls are discussed in detail to assist the designer of these important units. Get your copy of this helpful publication by checking the coupon.

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Investigate This Compact Flow Meter for Water

226. The Foster "Flow Tube" is a metering element that is compact and easy to install. Bulletin FT illustrates simple element containing nozzles for differential pressure production and shows capacity range and accuracy. Made in standard pipe sizes. Foster Engineering Co., Union, N. J. will send copy, or use coupon.

Helpful Valve Catalog For Engineers

236. For complete descriptions of Darling double disc, parallel seat gate valves be sure to get Bulletin 5002 issued by Darling Valve & Mfg. Co., Williamsport, Pa. Construction details covering all valve parts and accessories are helpful for specification writers. Check the coupon for your copy.

Complete Booklet on Pipe Line Equipment

246. Equipment for all types of jointing, maintenance and repair jobs on water, gas and sewer lines is described and illustrated in Catalog No. 25 issued by Joseph G. Pollard Co., New Hyde Park, N. Y. Leak detectors, pipe finders, melting kettles, cleaning tools and a full line of hand tools for water and sewer departments, and many other items are included. Be sure to get your copy now. Just check the coupon.

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247. With a Trojan pipe pusher and puller no resetting of grip is required, so the work goes twice as fast. Two models, for pipe up to 2" dia. Get full details by checking the coupon. Trojan Mfg. Co., 114 Race St., Troy, Ohio.

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280. Steel pipe lines, elevated tanks, treatment plant equipment and all other steel structures subject to rust, tuberculation and attack by aggressive soils can be protected by long-lasting Bitumastic enamels. Send for bulletins today so that you can specify the right coating for your job. Use coupon or write Koppers Co., Tar Products Div., Pittsburgh 19, Pa.

Factors to Consider in Elevated Tank Selection

299. Details on the several different types of elevated steel tanks, including capacity ranges, tank dimensions and other factors to be considered in the selection of elevated tanks for modern water storage, plus discussions of new tanks for old towers and foundations are included in Bulletin 101 of the Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. Check coupon for your copy.

Cleaning Service for Every Type of Pipe Line

302. Flexible Pipe Cleaning Co., operating with specialized equipment and trained crews, is prepared to remove scale, rust and other deposits from pipes for every type of service. For details and estimates furnished without obligation write Flexible Pipe Cleaning Co., Box 167, Los Nietos, Calif. or check the coupon.

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AND MATERIALS

What's Your Digging Problem? Repair Work? Trenches? Footings?

35. At today's prices, hand digging means the job will be costly. You can dig through asphalt and macadam, work fast and efficiently even in cramped areas with the tractor mounted Sherman Power Digger. From one position you can reach to dig 10 feet behind tractor in 140° arc and to depth of 8 feet. For full details check the coupon. Sherman Products, Inc., Royal Oak, Mich.

1,001 Profitable Uses For Holmes-Owen Loader

39. The addition of a Holmes-Owen Loader to your dump truck converts it into a complete digging and loading unit that enables one man to load, haul and dump. Illustrated folder shows how this self-loading unit with hydraulic crowding action can be a real time and labor saver for the municipality or contractor. Check the handy coupon for full data. Ernest Holmes Co., Chattanooga, Tenn.

Catalog Covers Complete Line of Adams Road Machinery

45. All machinery in the Adams line of road building and maintenance equipment is illustrated and described in an attractive catalog, Form 5110, issued by the J. D. Adams Mfg. Co., Indianapolis, Ind. Included are motor graders, self-propelled Traveloader, pull type graders and accessories. Check coupon for your copy of this comprehensive booklet.

Blades For All Types Of Equipment

60. Get information now on long-wearing blades for graders, scrapers, bulldozers, snow plows and scoops; snow plow noses and runners; scarifier teeth and numerous other products for road machinery. Check coupon or write to Paper-Calmenson & Co., St. Paul 8, Minn.

Check Your Power Needs Without Delay

68. International Harvester Company has available a folder describing its line of diesel engines and power units for all your power needs up to 180 hp. For a copy of this colorful booklet, write to International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., and ask for Form A-156-NN, or use the handy coupon and we will forward your request.

New Economy in Brush Clearing Work

78. Quick, effective brush cutting with the Brushmaster saw lets one man do the work of six when clearing brush for highway departments, on watersheds, along right-of-ways. Brambles, briars, vines, bushes, brush and saplings up to 4" dia. are easily cut with this lightweight, powerful tool. For full data check the coupon. Brushmaster Saw, Inc., 89 Emerald St., Keene, N. H.

Inexpensive Ditcher Handles Heavy Digging

91. The Shawnee Scout Ditcher, a new, heavier model for extensive digging has been added to the Shawnee line of ditchers and dozers. All models are designed to handle ditching and backfilling operations quickly, efficiently and at low cost. Full information on this equipment will be sent by Shawnee Mfg. Co., 1947 N. Topeka, Topeka, Kansas. Just check the coupon.

Gunite Costs Less On Repair Jobs

255. Be sure to investigate Gunite for repair of reservoirs, dams, water and sewage plant tanks, sewers, swimming pools, etc. Contact Eastern Gunite Co., Elkins Park, Pa. for full information, or use coupon.



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Snow Loader**

Big snows paralyze cities and businesses. The Barber-Greene Snow Loader removes snow at a clip of 7-11 yards per minute. A swivel conveyor keeps trucks moving in a continuous production line. Only one traffic lane is required. At a 15 m.p.h. road speed, the B-G Snow Loader moves from one location to another quickly.

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- Low Clearance—12' 0"
- Loads Over Cab or with Trucks Alongside
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- Ample Traction and Stability

**Other uses for
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After the snow season, the B-G Snow Loader, a year 'round machine, handles coal, leaves and other nonabrasives. Also, it can be converted into a Bucket Loader to handle aggregate materials.

283

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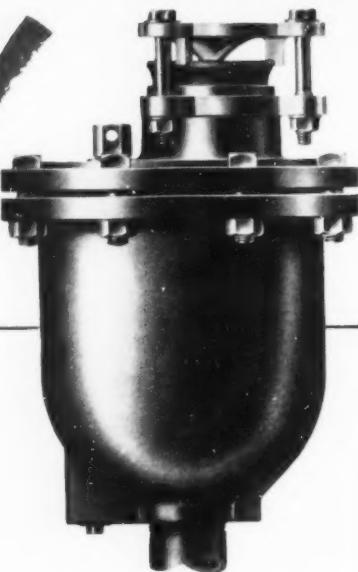
Aurora, Illinois, U. S. A.



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Choosing Trucks For Municipal Service

264. For all municipal services, trucks are needed that are high in efficiency and economy. Be sure to investigate the White 3000, engineered for high performance. Full details on White Super Power trucks from the White Motor Company, Cleveland 1, Ohio.

Details on Motor Grader Construction and Use

312. In a handsome catalog, profusely illustrated with diagrams and photographs of unusually fine quality, the Galion Iron Works and Mfg. Co., Galion, Ohio, has presented all details on the construction and operating features of their Model 118 motor grader. This impressive 28-page catalog, No. 375, is available without charge. Just check the coupon.

Trencher Fits Municipal Needs

315. A bulletin describing the Cleveland Model 95 trencher has been published by the Cleveland Trencher Co., Cleveland 17, Ohio. The Model 95, called "The standard machine for city and suburban work", is versatile, maneuverable and economical for use on water lines, service lines, road widening and all utilities trenching. Get this 8-page illustrated bulletin by checking the coupon.

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317. The power crawler-arm of the Lessmann loader gives you power shovel advantages in this tractor-mounted unit, and enables you to fill the bucket in tough digging without spinning the wheels. Check the coupon for all the details on this rugged, heavy-duty unit. Lessmann Mfg. Co., Des Moines 4, Iowa.

Unusual Presentation Shows Tractors Inside and Out

323. The four Diesel-powered Allis-Chalmers crawler tractors are presented "inside and out" in an unusual bulletin which shows details of construction of each model with full cutaway pictures, and the variety of applications of each on the job. You can get a copy from Allis-Chalmers Mfg. Co., Tractor Div., Milwaukee 1, Wis., or check the coupon.

CIVIL DEFENSE

Get the Facts on Air Raid Sirens

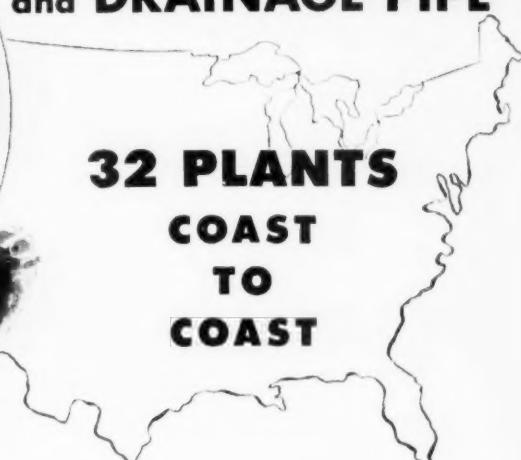
86. There's more to be considered in air raid warning sirens than the loudness of the signal. Get complete information on efficient size and spacing of sirens from Federal Enterprises, Inc., 8733 So. State St., Chicago, Ill., by using coupon.



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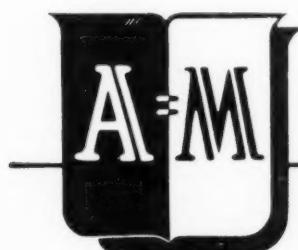
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20-Page Book Shows All Snow Plow Features

313. The full line of Ross snow plows, including one-way "Rigid" types, trip moldboard plows, Vee plows, snow wings, sidewalk plows and plow hitches, hydraulic controls, plus spreaders for ice control are featured in a profusely illustrated booklet issued by the Burch Corp., Crestline, Ohio. Be sure to get this comprehensive booklet and review your plow requirements. Check the coupon.

Ice Control Without Corrosion Dangers

282. Virtually all corrosion is prevented when rust inhibitor "Roxos" is used in conjunction with salt for snow and ice control. Properties of this material and performance results are described in bulletins issued by Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa. Check coupon for your copies.

REFUSE COLLECTION AND DISPOSAL

What You Should Know About Refuse Incinerators

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Your questions on mechanical stoking, burning rates and operating problems are discussed. Get Bulletins 217 and 223 from Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y. Just check the coupon.

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177. Strategically spotted bulk containers can be handled by one man operating a Dempster-Dumper equipped truck. Get full details of this cost-saving system of rubbish collection, as used by many cities to increase efficiency and eliminate unsanitary conditions. Write Dempster Brothers, Inc., 952 Dempster Bldg., Knoxville 17, Tenn., or use the handy coupon.

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How to Construct A Sanitary Fill

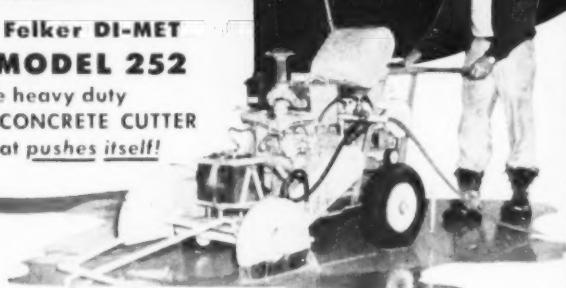
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**THE MODEL 252 IS SELF-PROPELLED! OVERCOMES
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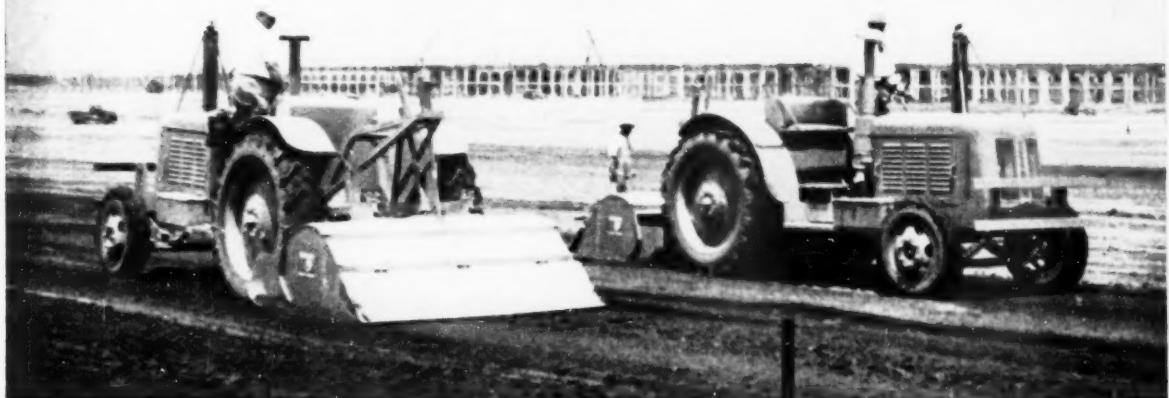
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Further, the Seaman TRAV-L-PLANT answers the ever-present questions:

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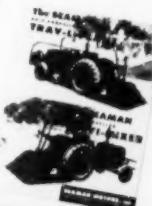
With the SEAMAN — if binders are developing unfavorable characteristics due to any one of many conditions beyond the control of the roadbuilder . . . if gradation of aggregates still needs correction — just make another pass with the SEAMAN — or as many as you need to bring the job to perfection. You can afford it — with plenty to spare — because multiple passes with the SEAMAN are fast and very low in cost.

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SPEED UP trench backfill jobs! End the nuisance of expensive "go back's" to add more dirt and to repair settled pavement areas. Use Barco Rammers to get **HIGH DEGREE COMPACTION** of original backfill **immediately**.

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Helpful Data On Outdoor Lighting Equipment

63. A complete catalog of standard Union Metal brackets, mast arms and accessory attachments for poles of every type, and including mounting instructions and illustrated construction details is now available from Union Metal Mfg. Co., Canton 5, Ohio. Get this important reference booklet by writing to the company, or check the coupon.

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225. To get all the benefits of mercury vapor lamp illumination, efficient transformers are required. Complete data on Jefferson Transformers for all outdoor and indoor installations is offered in 16-page illustrated Bulletin 521-5 by Jefferson Electric Co., Bellwood, Ill. Particular attention is given to street lighting applications. Get a copy now by checking the coupon.

Bitumuls Paving Handbook Full of Useful Data

23. The latest edition of the Bitumuls Paving Handbook covers a wealth of practical data on paving methods and materials, road and airport paving specifications and construction details, complete tabular data on asphaltic binder applications and aggregate requirements, condensed Asphalt Institute specifications plus data on Layfield compounded asphalt for flooring, roofs, joints, protective coatings and water proofing. You can have a copy by checking the coupon. American Bitumuls Co., 200 Bush St., San Francisco 4, Calif.

Faster Compaction On Street Repairs

108. Holes and trenches cut through pavement present difficult areas for compaction of backfill. Learn how to do the job quickly, easily and cheaply by using the self-contained, portable Barco Rammer. Full data on this unit cost will be found in Bulletin 621. Write Barco Mfg. Co., 500 No. Hough St., Barrington, Ill., or check the coupon.

Reference Manual on Guardrail Design

114. Here is an interesting and informative booklet in which all factors influencing guardrail design are outlined, and safety and economy discussed in detail. Eight pages are devoted to basic design data, with handy tables covering physical properties, tensile and beam strengths, deflection and other data. Write Armco Drainage and Metal Products, Inc., Dept. PW, Middletown, Ohio.

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150. The flexible Admum Black Top Paver lays any asphalt mix, hot or cold, in widths from 6 ft. to 13 ft. Careful design lowers operating cost and cuts maintenance. Attachments spread stone, cinders or slag. Get full data on this machine by checking coupon. The Foote Co., 1954 State St., Nunda, N. Y.

Soil-Cement Information: Short-Cut Testing Procedures

159. A 12-page booklet entitled "Short-Cut Soil-Cement Testing Procedures for Sandy Soils" is now available from the Portland Cement Assn., 22 W. Grand Ave., Chicago 10, Ill. Charts in the booklet are planned to reduce laboratory work for the scientific testing and control procedures developed by PCA. Get your copy by checking the coupon.

How Reflective Sheeting Improves Traffic Signs

157. Get full data on Grotelite reflective sheeting for smooth, brilliant, long-life traffic signs and marking devices from the Grotelite Mfg. Co., Bellevue, Ky. Use the handy card or coupon today.

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231. Accurate control for spreading crushed rock, chips, sand or ice control materials is featured by all models of Highway Equipment Co. materials spreaders. Data on both trailer and tailboard types available by checking the coupon. Highway Equipment Co., 630 D. Ave., Cedar Rapids, Iowa.

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How To Build Stabilized Heavy Traffic Pavements

233. A 16-page booklet published by Seaman Motors, Inc., Milwaukee, Wis., shows how low cost, local materials may be utilized in the construction of heavy-duty pavements. Many illustrations and well-written text give full instructions on materials and construction methods for subgrades, subbases and base courses. A worth-while booklet for every highway engineer. Check the coupon for copy.

Latest Data on Rubber Roads

296. A report covering all developments to date on the use of natural rubber in road surfacing of asphalt highways has been issued by the Natural Rubber Bureau, 1631 K St., N. W., Washington 6, D. C. Get your copy of this 52-page booklet which includes new data on research and full reports on test roads in many states. Use the handy coupon.

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Helpful Installation Manual For Drainage Structures

62. A 46-page manual, well worth careful study by designers and field engineers dealing with drainage structures, culverts, sewers or conduits, is offered by Armco Drainage & Metal Products, Inc., Middletown, Ohio. Proper location of the structures, base preparation, assembly and backfill are some of the many items covered in detail. Use the handy coupon for free copy.

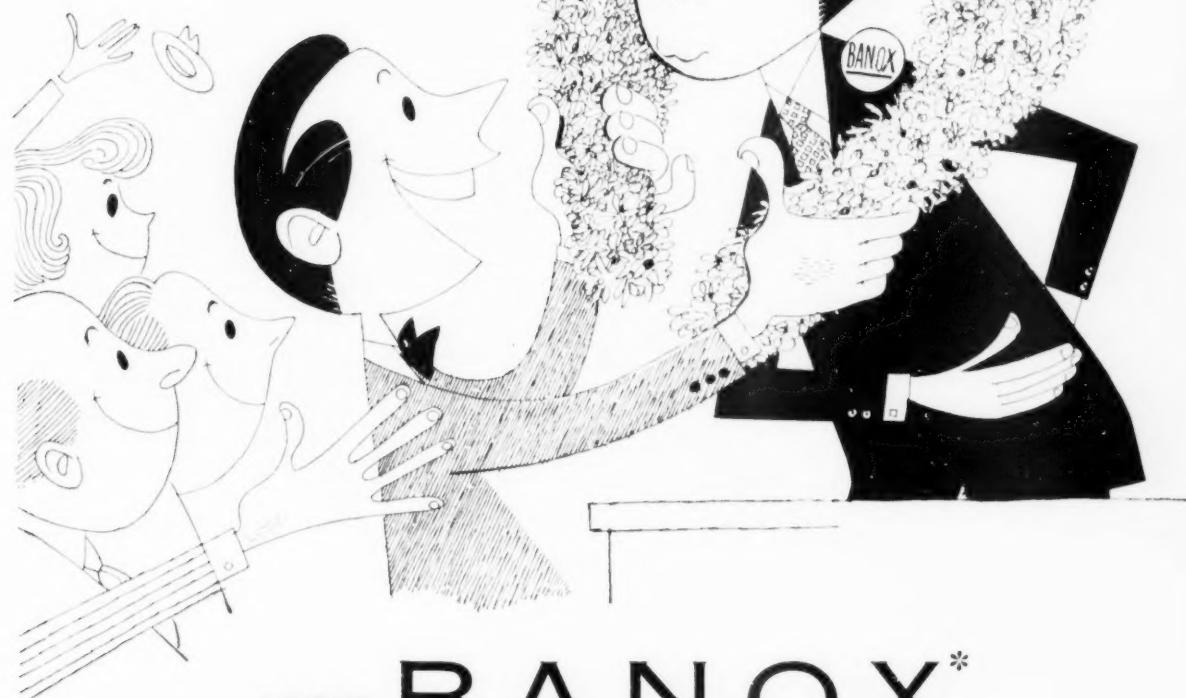
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96. You'll like every feature of the Austin-Western 9911 Grader. It has all-wheel drive, all-wheel steer, controlled traction, precision sideshift and a high lift, extreme reach, reversible blade. Get data from Austin-Western Co., Aurora, Ill.

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Remember, all you need to get that vote of thanks is a pound of Banox to every hundred pounds of salt. Send for your free copy of "Stop, Look and Save with Banox."



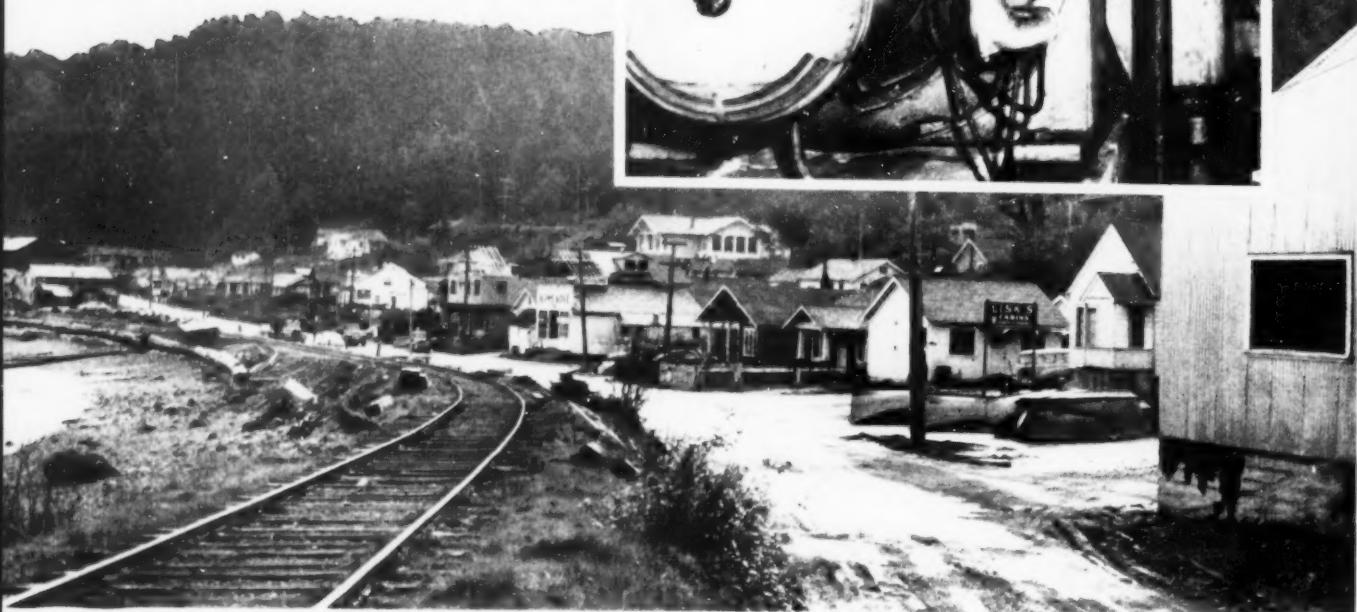
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In addition to serving the immediate community, the local power company generates sufficient power with its D375 to supply a logging company in nearby Sekiu.

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WE'VE MADE CLAIMS...
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PROVE THEM

PUBLIC WORKS Magazine

VOLUME 84 • Number 11

NOVEMBER, 1953

THE
PRESENT

STATUS OF RAINMAKING

T. H. EVANS,

Dean of Engineering

Colorado A & M College

In July 1951 I wrote an article for Public Works outlining some of the problems connected with artificial rainmaking. At that time the art was really snowballing along at a tremendous rate and millions of dollars in projects were contracted for, mainly throughout the West, by commercial rainmaking firms. Some of these concerns made startling claims about increasing natural precipitation, breaking drouths, preventing hail, or preventing unwanted precipitation. A gullible, water-hungry public in the western states welcomed these bearers of miracles with open arms, and signed astounding, one-sided contracts for considerable sums without requiring any measurable results whatever in most cases.

Today throughout the West, it is reported with great regret, we still have the same searing drouths, the same disastrous floods, the same vicious hail storms, the same tremendous extremes that we have always had naturally in precipitation. The astounding past claims of some of the operators, through their elaborate publicity setups, are hardly ever heard these days. None of the claims mislead the public any more into thinking they can "make" rain—and, therefore, they cannot "break" a drouth. They talk these days only of hoping they can increase the amount of precipitation that would fall. Even at the peak

two years ago a commercial operator always had an easy out in case of a poor season. He could (and usually did) say there was insufficient seeding opportunity.

Slowing the Snowball

The snowball was slowed up considerably and badly shattered in August of 1951 when one of the first impartial scientific reports was issued by the Engineering School at Colorado Agricultural and Mechanical College. In that report, as in most that have followed from truly impartial and scientific agencies, there was no evidence found that the natural precipitation had been altered in north central Colorado by an operation using silver iodide and ground generators. Nor has it been possible to state that there is conclusive evidence that the art won't

work. In other words, we still have no conclusive proof either way. There isn't much question, however, that if anything is happening artificially it is of rather small magnitude, otherwise our statistical methods of analysis should indicate consistently significant differences from the natural expectation. They don't seem to, however.

The public in general seems to be very disillusioned and much more skeptical these days, and wants some proof from a source it can believe before it will go overboard again on expensive trials with no proven results. Since the results, whatever they may be, seem to be of rather small magnitude, it would take years of truly scientific evaluation under adequate control to determine their significance by available statistical

(Continued on page 126)



● SNOW COVER in the mountains is important, contributing to stream flow.

AUTOMATIC SIGNAL

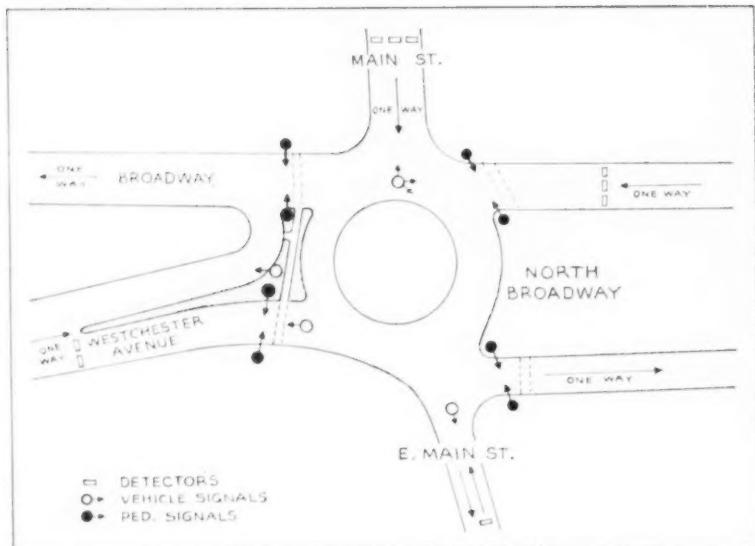
will pay for itself
in 3 years

In White Plains, N. Y., public officials are basking in the approval of both pedestrians and motorists since they altered a traffic circle and substituted automatic signals for overworked policemen at Broadway and Main Street. One happy feature is that now only one officer is assigned for light duty at the spot that previously required two and often three men. The savings in salaries of policemen needed at this one spot will liquidate the cost of the signal system in only three years.

Six major streets meet at this traffic circle. As populations grew in White Plains and adjacent areas traffic passing through the intersection increased to 25,000 vehicles a day. There were very high peaks that caused traffic to back up in Main Street and Westchester Avenue during rush hours. At those times three policemen could not keep the trucks, buses, passenger cars and pedestrians moving smoothly. The largest apartment houses in White Plains are located around this traffic circle. Residents of those apartments must cross the circle to get to the shopping area and the railroad station. That introduces far more than the normal number of pedestrians into the intersection. Where the street around the circle was wide enough for two autos, a truck or bus had the effect of making it only wide enough for one.

A study of the situation showed three changes were necessary to make traffic flow smoothly: 1) the streets should be made wide enough where they meet the circle to take care of three cars and the width of street that pedestrians have to cross should be greatly reduced; 2) most streets coming into the circle should be made one-way; and 3) automatic traffic signals would have to replace policemen.

Several of the streets involved were county roads so permission first had to be obtained from West-



● INTERSECTION of Main St., Westchester Ave., and N. Broadway, showing signals.

chester County for White Plains to make physical changes in the streets, even at its own expense. When that was given the city Public Works Department prepared plans for the reconstruction in the summer of 1952. The general layout is shown herewith.

The first change was to make five of the streets meeting at the traffic circle one-way. Main Street, Westchester Avenue and the west lane of North Broadway were made one-way into the circle. South Broadway and the east lane of North Broadway are one-way carrying traffic out of the circle. East Main Street remains two-way. It was then decided to carry the incoming Westchester Avenue traffic that wanted to turn left directly into South Broadway without going around the circle. The corner was cut back to permit this and the grade was raised above the part of Westchester Avenue that leads into the circle. The avenue was widened to make two full lanes. To make turning easier one corner of the east lane of North Broadway

also was cut back. An island was built between the circle and the newly raised lane of Westchester Avenue and a sidewalk was constructed on it to shorten materially the distance pedestrians have to walk in the street. This is clearly shown in the drawing. During the course of this work the Department of Public Works laid the underground conduits for the signals. These changes in themselves greatly improved the movement of traffic at this important intersection. The installation of automatic signals completed the improvement.

The Super Electro-Matic Dispatcher made by Automatic Signal Division of Eastern Industries was chosen to control the traffic signals and a Minor Movement Controller was added to provide an opportunity for pedestrians to initiate a Walk period. Claims made for this type of dispatcher were so fantastic city officials refused to believe it would do what the makers said. The manufacturer then showed, through a working model, that the Dispatcher would do everything

claimed for it and that induced the city to make the purchase. Now, with the operation going into its second year, Commissioner of Public Safety, Frank T. Hanlon told PUBLIC WORKS its performance is still literally amazing.

Here's how the signals work: Vehicle detectors were installed about 250 feet back from the intersection on each street that feeds traffic in. The volume and density of traffic approaching from all directions control the interval between the green and red lights. The Super Electro-Matic Dispatcher is notified by the detectors each time a car approaches. It balances the demand on the street having the green light against the accumulation of cars on the street having the red light. Allocation of the green light is made automatically on the basis of which streets need it most, assuring that greatest possible traffic volumes are always moving through the intersection. The time intervals are constantly and automatically being adjusted by approaching vehicles.

The length of the green light varies in proportion to the number of cars and also to the spacings of the cars between the vehicle detectors and the intersection. If there are but 3 or 4 cars the light will be green for only about 12 seconds and will immediately change on passage of the last car into the intersection so the green light shows on the other street if there are cars waiting there. On the other hand, 45 or 50 cars, or let us say extremely heavy traffic, bumper to bumper, moving freely in all lanes, can retain the green light up to 60 seconds providing the demand on the opposite phase is light.

The Dispatcher registers every car on both A and B phase approaches to the intersection and allots time for the safe passage of these vehicles. If, however, cars begin to straggle and have large gaps between them the Dispatcher will not tolerate this type of operation. If there are cars waiting against red on the opposite phase it will automatically cut off the stragglers and go to the opposite phase to take care of the waiting cars. However, the Dispatcher has a memory feature and upon taking care of these waiting cars will automatically go back and pick up the stragglers that have crossed the detector and are waiting against the red light. This is done without further actuation of the detectors that are located



● AIR VIEW of the intersection taken from point between Main St. & N. Broadway.

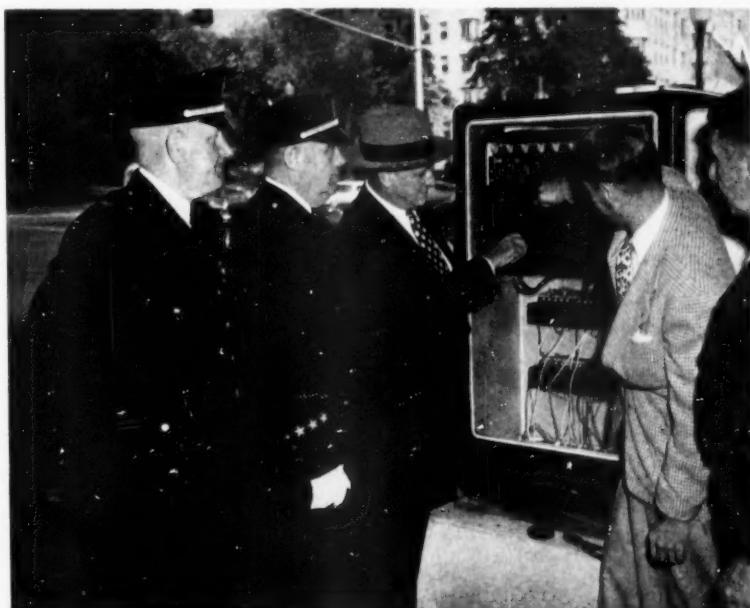
on each approach some 250 to 300 feet from the stop lines.

Protecting Pedestrians

When a pedestrian pushes a button at the cross walk he brings the Minor Movement Controller into operation. This sets up a WALK period during which all traffic has a red light and there is no possibility of traffic turning left or right into pedestrians. There is one exception, in that traffic coming up

Westchester Avenue and turning left into South Broadway may continue to operate during the 12-second WALK period because this flow of traffic does not interfere in any way with people walking. The Minor Movement Controller operating the WALK lights comes into play only when a pedestrian pushes the button. In the absence of this act by a pedestrian it is automatically omitted from the cycle.

(Continued on page 62)



● L to R: Chief of Police Wm. Sullivan, Lt. John Drohan in charge of traffic, Comm. Frank Hanlon, Mr. Barrett and Sgt. Cunningham inspect the interior of the unit.

How to get PUBLIC EMPLOYEE SAFETY

WENDELL R. LaDUE,

Chief Engineer & Superintendent, Bureau of Water & Sewerage, Akron, Ohio.

ACH year I continue to be impressed and shocked by the fact that public employees, from the Federal down through all grades of government to the municipal level, represent the largest single group in the United States not generally subject to enforced formal safety standards, regulations and programs. Fortunately, there are outstanding exceptions at all levels, and these point out forcefully the real need for positive action by the majority.

In Akron, we have had a safety program in effect since 1938 and it has grown progressively more active since its initiation. Under this plan, each Division and Department is responsible directly to the Mayor for its own efforts and results in personnel safety. By direct delegation of orders and authority, the department head passes responsibilities to the division heads, who in turn, hold all supervision responsible for direct worker contact. Safety programs and efforts are spearheaded and coordinated through the Safety and Claims Division of the Department of Personnel, Civil Service Commission. Heading this Division is a full time trained employee, the Safety Officer, George B. Hay. The status of the City's efforts in safety practice is reported through his office to the departments and divisions and the Mayor. His duties cover all activities of the City—office personnel, police, fire services, water supply,

sewerage, parks and highways. His duties include the following:

Departmental Safety News—This is a four-to-eight-page pamphlet which is distributed monthly to all employees. It contains inspirational, informative and statistical material, both of general and specific interest. To create a general spirit of rivalry, comparative and relative safety standings are given for each division.

Safety Contests—Safety contests are promoted as the occasion warrants. "White Elephants" and "Behind-the-Eight-Ball" trophies are presented for serious deficiencies. Awards are made for meritorious ratings.

Training Programs—From time to time it is found beneficial to conduct training courses for supervisory personnel. In the light of a new development or process, this is essential to keep supervisors abreast of progress. Civil Defense training is an important element of this effort, and all supervision has been trained in standard First-Aid.

Safety Organizations—As a member of the American Society of Safety Engineers, the Safety Officer

This is a condensation of a copyrighted article from the November, 1953, Journal American Water Works Association.

The safety posters on the facing page were furnished through the courtesy of the National Safety Council.

becomes fully informed on national progress. He affiliates himself with local and state sections.

Relative Statistics—Using standard methods the "safety man" compiles safety statistics for the various city subdivisions, listing relative standings in severity and frequency. Such data give valuable means of comparison with those few cities that do conduct safety programs of a comparably high pattern.

Compensation Claims—The state of Ohio has a compulsory workmen's compensation Law. In proportion to the severity of its accidents the City must pay its just share of expense involved in administering the Act. The value of accurate statistics is at once apparent. The monetary value to the City, accruing through accident reduction, is also evident. The "safety man" clears all Workmen's Compensation papers through his office, and, with the aid of the Law Department, acts as the City's agent in matters involving the Compensation Law.

Safety Inspections—In conjunction with a representative of the Industrial Commission of Ohio, periodic inspections are made of the City's work areas. A report is prepared and given to the Mayor with copies to Department Heads. All violations of working conditions are cited with recommendation for correction. A repeated violation draws a sharp, but earned rebuke.

Safety Program Methods

As a part of supervisory training, all supervisors are required to know how to proceed in cases of injury. A knowledge of First Aid is therefore essential. General instructions by the Division Head are given from time to time as new ideas or needs develop.

Accident Report Forms—It is highly important in any program to know what happened and why it happened. A preliminary report is filled in and telephoned to the Division office immediately after an injury accident. Much time was spent in the development of a form on which the supervisor reports the case. It does not attempt to blame or place blame, but is a concise record of what happened and requires supervision to know *why* it happened and what he recommends be done to prevent recurrence. Instructions require that this form, fully filled out, reach the Safety and Claims Office within forty-eight hours of the time of the injury.



Medical Care—The best traumatic surgeons in the City are made available to the injured employee. The employee has the obligation, however, of presenting himself for treatment of all reported injuries. Constant check is maintained of injured employees by supervision upon advice of the attending physician.

Workmen's Compensation Claims—Medical examination is important in the filing of Workmen's Compensation claims, which again, the employee is obligated to do. The Safety and Claims Office aids the employee by securing statements from the attending physician, reviewing the statement, and then forwarding it to the Industrial Commission of Ohio.

Protective Devices—Many protective devices, such as goggles, gloves, masks and gas detectors, are

furnished as an obligation of the City. In certain processes, protective devices are a necessity in order to carry out instructions. The employee may go beyond these essentials further to protect himself. Proper arrangements are maintained to enable the employee to secure, at reduced rates, eye examinations and safety prescription glasses. Advice and encouragement are given the employees in the procurement of safety clothing and, in particular, safety shoes. Supervision sets the example.

Literature and Posters—Excellent results may be obtained through the consistent, but not boring, use of safety literature, posters or dodger. Outstanding efforts along these lines are continuous with both the National Safety Council and the Industrial Commission of Ohio.



presently constituted, it comprises twenty men, chairmen of groups or divisional safety committees plus members at large. It meets the last Thursday of every other month. It acts as a Board of Review on all accident reports and follows through on investigations on all matters pertaining to safety, including plans for betterment. The general committee has as its Chairman the Personnel Director of the Civil Service Commission, and for its secretary, the Safety Officer.

This advisory committee hears reports of all group or divisional safety committees, reviews safety suggestions made and adopted, and investigates reports of all accidents occurring within its jurisdiction.

Each division of City Employment now has active safety committees (usually non-supervisory).

(Continued on page 122)



It Hurts to Get Hurt!



National Safety Council—Akron is proud of the fact that it was one of the first cities in the United States to adopt the new comprehensive Public Employees Membership privileges, afforded by an Industrial Membership in the National Safety Council. The value of this contact to the City's safety program is a matter of continual growth.

Safety Committees

The activities of the General Safety Advisory Committee provide the mainspring controlling the effectiveness of the entire safety program. This committee is appointed by the Mayor to coordinate the efforts of all safety programs and to effect close liaison between supervision and operating personnel. As



CHICAGO'S Economical Sanitary Fill

E. J. KNUDSEN

BY using a unique slag covering method over its refuse at its 103rd and Doty sanitary fill, Chicago's Dept. of Sanitation has achieved an economy of refuse disposal costs that is among the lowest in the nation. The fill covers a 280-acre area at the northern tip of Lake Calumet about 12 miles south of Chicago's loop. The swampy terrain is separated from the Lake by a dike built up from refuse, broken concrete and slag to a height of about 12 ft.

Into this area, refuse collected within the confines of the city is dumped. The operation is a motorized one, utilizing a fleet of 365 dump trucks. About 175 of these trucks are in use each day. They are mainly Autocars with Leach 18-yd. Packmaster bodies and General Motor rigs with 18-yd. Heil hydraulic dump bodies. Operations are carried on during both a day and a night shift. A crew of 17 are employed on the day shift and a crew of 12 during the night.

To reduce expensive haul cycles to the far north side of Chicago, a

shuttle system has been set up whereby a portion of the truck fleet dumps its loads into Illinois Central gondola cars at the 26th St. loading platform for railroad transport to the sanitary fill.

Methods of refuse disposal at the fill begin at the inspection shanty where each truck load is inspected for full loadings. The trucks then continue over the compacted refuse and dump their loads at the fill line.

For the spreading and compacting phase of the work, an Allis-Chalmers HD-10 tractor is used. The refuse is compacted in layers of 6 to 8-ft. depth. The dump trucks assist in effecting compaction in passing over their previous dumpings.

For covering the refuse, slag is trucked in from nearby steel mills. From 160 to 180 yds. per day are used, most of which is obtained free of charge. Then working several hundred feet behind, another Allis-Chalmers HD-10 spreads and compacts the slag in 2-ft. lifts. The slag

cover makes an excellent haul road for the dump trucks. Besides the HD 10's there are several Allis-Chalmers HD-114's held in reserve in the tractor fleet.

Other advantages in using the slag are: 1) It renders the sanitary fill rodent-free; 2) It reduces fire hazards. (Small fires are amply taken care of by water supply in the 3,000 ft. of 5-in. pipe installation on the grounds.); 3) It keeps the district almost stench-free; and 4) It prevents air-pollution. These findings were corroborated by the Chicago Health Dept. during its periodic checks. The total cost of moving refuse to the fill is kept very low.

The landfill is on state property. Operations were started in December, 1940 and it is expected that the area can be used for another 10 years before saturation is reached. Plans for an eventual state park at the fill are in the speculation stage at this time. With this in view, sandwiching of the slag coverings over refuse layers will be practiced to attain proper grading.



● COLLECTION truck being checked as it arrives at the landfill to see that it is fully loaded.



● DUMPING at the sanitary fill. A GMC truck equipped with Heil body is shown discharging its load.



● SPREADING refuse after dumping, using A-C tractor & loader. Layers of refuse are 6 to 8 ft. deep.



● SLAG from nearby steel mills is used for covering the fill. Slag layers are sandwiched with refuse.



● AIR VIEW of Garland's modern sewage treatment installation.

Allison Construction Co., MCA, of Dallas, were the contractors. Construction was under the direct supervision of Ralph Wylie, partner in the firm. Homer A. Hunter Associates, of Dallas, were the consulting engineers. W. J. Wischmeyer was the resident engineer.

The further data supplied by Mr. Dixon are as follows:

The clarifier equipment and distributors were furnished by Ralph B. Carter Co.; sludge pumps,

Sewage Treatment Meets "AMAZING GROWTH" Problem

GRWTH always brings problems, and that is the case with Garland, Texas. A population of 2,000 in 1940 jumped to more than 10,000 in 1950; and since then the rate of growth has been some four times as fast as previously. Now population is close to 20,000. To meet this problem, city officials have looked well into the future and they are armed with a plan designed to be adequate when the area will have twice as many people as it has now.

Among the big jobs to be done was the relief of the over-loaded sewage treatment plant. Mayor H. A. Walker and City Manager L. E. Stark have solved this problem by building a new and expandable plant, while using the old plant for treating up to half a million gallons a day. The new plant was described briefly in "Plans and Specs", publication of the Municipal Contractors Association of Dallas, and additional data and photographs were furnished by R. M. Dixon, well-known engineer, who is secretary of the Association.

The new plant has a capacity of 2.0 mgd, while the old plant will continue to treat 0.5 mgd. This 2.5 mgd capacity is expected to be adequate for about five years, when additions will be made to the new plant which is laid out for easy expansion. Sewage enters the plant by gravity flow through a mechanical bar screen, Parshall flume, grit removal chamber, primary clarifier and thence into a sump at the pump station. Pumps lift the sewage onto

the trickling filters which include one high rate "roughing" filter and two standard rate filters. A portion of the effluent from the roughing filter is returned to the junction box and through the primary clarifier with the raw sewage. The remainder of the effluent from the roughing filter is picked up by another set of pumps which lift it to the standard rate filters, and from there it is collected in a final clarifier and settled before being discharged into Rowlett Creek, a Trinity River tributary. The high rate trickling filter is 100 ft. in diameter with 3 ft. of rock depth, or 0.54 acre-feet of filter material. The standard rate filters are 110 ft. in diameter with 6 ft. of rock depth, or 2.64 acre-feet of filter material in both units. The final clarifier is 45 ft. in diameter with mechanical sludge collection equipment and a side water depth of 10 ft. At a flow of 2 mgd, this tank has a detention time of 1.6 hours.

Where possible, units were oversized to prepare for the time when plant capacity will be expanded. Design flow of the grit removal chamber and of the 65 ft. diameter clarifier is 3 mgd. The Parshall flume has indicating, totalizing and recording equipment located in the pump station.

The engineer estimates that the plant will remove 95% of the strength of the raw sewage which is considered relatively strong (BOD of 400 ppm).

Cost of the plant and equipment was approximately \$376,000. H. F.

mechanical bar screen, grinder and grit removal equipment by Chain Belt; sewage pumps by Fairbanks-Morse; a dual unit digester (primary and secondary) has a concrete dome on the primary equipped with a Carter mixer and a Pacific Flush Tank floating cover on the secondary; gas equipment is by PFT. Laboratory equipment is standard, all of which was supplied by Sargent; metering equipment by Builders-Providence. The filter underdrains were manufactured and furnished by Texas Vitrified Pipe Co., of Mineral Wells, Texas. Sludge beds have an area of 1200 sq. ft.

The screenings grinder is not belt fed. Screenings have to be manually fed and it shuts off on manual operation. The bar screen has 1-in. clear openings. Screenings, after grindings, are returned to the raw sewage. The metering is through a Parshall flume which has a recorder manufactured by Builders-Providence. The grit chamber is equipped with mechanical collectors and provides for slowing the flow for deposition of materials that should not enter the primary clarifier. I have no figures on velocities. Rock for the filters was furnished by Southwestern Stone Co., of Dallas, (from their Chico, Texas quarry), price \$1.70 a ton f.o.b. the quarry; freight was \$1.63 a ton. It weighs about 2400 lbs. per yard. Cost of placing was in addition thereto.

The rock, which is a relatively hard and weather resistant limestone, was re-screened before it was put in place. Heavy equipment was



Courtesy Dallas News

● CLOSE-UP of trickling filter, one of the key units in Garland's treatment plant. At left is City Manager L. E. Stark; at right Contractor Ralph Wylie.

not permitted on the surface of the filters during placement of the stone. The stone varied from 2 to 4-inch, passing clear openings.

The digesters are 45 ft. in diameter and have a combined capacity of 78,440 cubic feet. The primary digester is equipped with a stirring device which involves a draft tube, shaft and propeller. The secondary, which has a floating cover, has a PFT gas burner to handle excess gas.

It might be further stated that much of the waste is industrial and the big problem is waste from a pickle factory. When they dump the brine tanks the chlorides go completely off the scale. The old plant referred to in the article was often in an upset condition because of the pickle waste; and later, from a load far in excess of its design capacity, but I think the high chlorides of the pickle waste were probably enough to have kept it from operating under any load. It will be interesting to note the effect of the pickle waste on the new plant, but with the recirculation and blending provided in the primary sedimentation it may be that they will be handled satisfactorily, provided they are dumped at night and part of the chlorides can be bypassed without involving too much organic material. Treatment will not change the chlorides going through the plant and therefore I see very little objection to by-passing some of this kind of junk and preventing the biological beds from taking a beating.

Garland is growing rapidly, from the residential as well as industrial standpoints. Safeway is building an 8-million dollar distribution plant which will serve the entire Southwest. I do not know what operations will be involved, but I feel sure that there will be some manufacturing and food processing. Kraft has a large cheese plant there and there is a men's hat factory, a couple of airplane sub-assembly manufacturing plants, and several other similar industries.

The residential growth is phenomenal, but then in some instances it is no different from some of the growth around Houston, Fort Worth and other suburbs of Dallas. The town has had to do a lot of paving and underground utilities installations to keep up with its growth.

Vibrating Screens for Industrial Waste Treatment

For the removal of solids from woolen waste water, the Lebanon Woolen Mills, Lebanon, Tenn., use two 48-inch diameter Southwestern Engineering Co. vibrating screen separators. The wastes are passed through 80-mesh stainless steel mesh cloths having a wire opening size of 0.007 in. Solids to be screened include linters, detergent chemicals and "eyebrows" which are short hairs from legs and shanks of sheep, tapered in shape and with a diameter of about 0.0034 in. at the large end. Total flow is 800 gpm.

At Griffin, Ga., the Pomona Products Co. screens 900 gpm of cannery waste. Tomatoes, potatoes, pimentos, string beans and other vegetables are processed. For these wastes, a 150-mesh stainless steel Southwestern screen is used; and for peach wastes a 40-mesh screen cloth with 0.0150-in. wire opening. Two screen units are now in service. The Georgia Tech Experiment Station reports that these screens did a fine job in removing solids.

● ● ●

Sidewalk Snow Removal Pleases Citizens

AFTER a last winter snowfall, Dearborn's (Mich.) 27,000 home owners woke up to discover that 26 snow plows and rotary brooms were clearing their sidewalks. It is believed that, as the operators become more experienced, it will be possible to clear the city's 521 miles of sidewalks in about 4 hours. Responsible for this fine piece of work—and the ensuing good public relations—were Mayor Orville L. Hubbard and Director of Public Works Harry A. Hoxie.



● ONE OF the 26 snowplows that made Dearborn's homeowners happy last winter. These plows clear the 521 miles of walks in about 4 hours.

FINANCING

CONNECTICUT'S TOWN HIGHWAY SYSTEM

THE approximately 15,000 miles of public roads in Connecticut consist of about 3,000 miles of state highways and 12,000 miles of town roads. Of this town road mileage just under 10,000 miles are improved roads and slightly over 2,000 miles are unimproved.

Unlike many states in the country, Connecticut has no county roads. Those roads which are not state highways belong to the towns and it is the responsibility of each of the 169 Connecticut towns to maintain the town roads within their boundaries.

In 1931, to get Connecticut "out of the mud", the General Assembly provided a sum of \$3,000,000 for each fiscal year out of funds collected by the commissioner of motor vehicles to be allocated to the towns and "to be used under the supervision of the highway commissioner for construction, reconstruction, improvement or maintenance of highways, sections of highways, bridges or structures incidental to highways and bridges or the improvement thereof". No part of this fund was to be expended on state maintained highways. In 1943 this fund was increased to \$4,000,000 and in 1947 to \$5,000,000.

From 1931 to 1944 fourteen annual allotments of \$17,750 were made to each of the towns. In the years 1945 through 1947 the annual allotments were changed to three of \$23,668 for each town. There were seven cities and boroughs which did not participate under the old laws. Since 1947, allotments are made on the basis of \$1,000 per mile for each mile of improved road for the first twenty-three miles and \$250 per mile for each mile in excess of twenty-three miles of improved roads. Cities and boroughs not consolidated with their towns, and having responsibility for construction and maintenance of public roads, receive a pro rata share of the sum allotted to the town, computed in the ratio of the miles of improved roads in the city or borough to the miles of improved roads in the remainder of the town.

A second fund of \$1,000,000 annually was authorized in 1941 by the

General Assembly. This allocation was from the highway fund and is distributed pro rata to the towns on the basis of the total mileage of unimproved highways in each town. These funds are expended for the improvement of dirt and unimproved roads, including bridges on these roads. The money can be used only for construction and once the work has been completed the new section of road is added to the town improved road mileage and future allotments are computed on the basis of the new figures.

officials and the highway town agent, representing the highway commissioner, are held to resolve, on a friendly basis, the points of disagreement. In the event the highway town agent and the selectmen of any town are unable to agree on the number of miles of highway in the various categories in the town, the highway commissioner determines the mileages. Any town aggrieved by the action of the highway commissioner may, within thirty days, appeal to the superior court.

Complete agreement on mileages is important because the allocations of funds to the various towns is based on total improved and unimproved mileages in each town.

Once the schedule of allocations has been determined, the highway town agent consults with the towns and negotiates agreements for the expenditure of their allotments. The towns themselves determine where the improvements are to be made. The state highway department's interest is to see that the money is used in accordance with the state statutes and good engineering practices.

After a town aid agreement has been signed the state highway district engineer meets with town officials to inspect the roads concerned and to discuss the various aspects of the projects.

When the proposed work has been approved the district engineer notifies the town officials of the approval and requests a further meeting to decide when the work is to start.

All materials used in the work and paid for from town aid funds must meet the highway department specifications. Materials for which the state has received bids and quotations may be purchased directly by the towns from vendors approved by the state highway department or may be purchased by the state. Certain types of materials, not covered by the bids or quotations mentioned previously, may be purchased locally with the approval of the district engineer providing the cost does not exceed the prevailing price for similar material.



● **PROBLEM:** To improve roads such as this one within available funds.

Town aid funds cannot be used for snow removal, correction of icy conditions, sidewalk construction, erection of warning or directional signs, purchase of equipment, tree cutting and quasi-public roads which lead into municipally owned property such as town halls, schools, libraries, firehouses and others. They may, however, be used for road maintenance or construction or both.

Prior to the allocation of town aid funds the state highway commissioner sends statements annually to each city, town, or borough showing the total miles of improved and unimproved roads credited to each of these units. The officials of each municipality are requested to show acceptance or disagreement with these data. Whenever any question arises about the accuracy of the figures, conferences between the town material.



● ALL-WEATHER roads, such as this one, are available throughout the state. An outstanding job has been done in providing such a fine system of roads.

To make possible the full utilization of materials from local sources of supply the highway department has encouraged all vendors of town aid road materials to submit prices. The selectmen of the various towns can help by urging established suppliers in their towns to submit bids and quotations when asked.

The completed mileages under the town aid programs vary from year to year. It is the decision of the town officials of each town which determines whether the allocated funds are to be used for construction or for maintenance. Towns which have adequate highway forces and equipment may in some instances decide to receive their allocations in the form of materials supplied by the state. In doing this they are able to take advantage of the lower prices the state highway department can obtain when requesting large quantity bids for its own maintenance and construction programs as well as the town aid projects. The use of town forces and some town funds, in addition to the materials received from the state in lieu of money, in many cases enables these towns to improve a greater amount of mileage than would be possible under contract arrangements.

Connecticut has done much in constructing and improving town roads. It has been through the cooperation and understanding be-

tween town officials and the state highway department that so much has been accomplished. Connecticut is definitely "out of the mud".

Editorial Note: The state of Connecticut has done an outstanding job of providing secondary roads for its citizens. Practically every farmer can drive over all all-weather roads from his house to one of the main highways of the state highway system. Well distributed, good road building gravel, efficient construction methods and excellent co-operation between the State Highway Department and the local road officials have made this possible. We asked Commissioner Hill to tell our readers how the Town Aid Program has worked in Connecticut.



● RESULT: A typical town highway after rebuilding and improvement.

Automatic Signal

(Continued from page 53)

There is no time lost by having the WALK signal come in every cycle when no pedestrians are waiting. The locations of all signals were marked out by engineers of The Automatic Signal Div.

Public relations are well handled in White Plains and played an important part in this change-over. The editor of the local newspaper was called in when the first discussions took place. So was the traffic committee of the Business Federation. They were kept informed of what was being planned and the newspaper told the public as fast as any action took place. When the change was completed everything was as expected and no one was surprised. At first many pedestrians seemed to resent having to push the button to bring on the WALK period. But that feeling soon disappeared as they realized the advantage it gave them of safety from all traffic. The general public reaction has been extremely favorable. As a result White Plains is planning a similar installation one block further north where Lake Street and Hamilton Avenue join the east and west lanes of North Broadway.

Cost of the physical changes in streets and curbs and the underground work for the traffic controls came to slightly over \$49,000. The signals and dispatcher cost approximately \$12,000.

White Plains is on a pay-as-you-go basis and no bonds were issued to finance this project. The city also has provided remarkably fine off-street parking facilities for all business areas on a pay-as-you-go basis and that will be the subject of another article in PUBLIC WORKS in the near future. Eric Andrews is Commissioner of Public Works and Frank T. Hanlon is Commissioner of Public Safety. Edwin G. Michelian is mayor.

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Operating Seattle's Sanitary Fill

The lifts on the Seattle sanitary fill are limited to 8 ft., according to W. R. Johnson, Sr. Engr., Seattle, Wash. Garbage is dumped at the toe of the fill and pushed up to the top with a D6 dozer." "This procedure compacts the garbage, saves space, eliminates fire and rodent problems and reduces the settlement of the fill to an unobjectionable degree."

TRASH

the Big Headache

LOCATED on the Gulf of Mexico, St. Petersburg has a semi-tropical climate with a resultant year-round growth of vegetation. Even though growth slows down considerably during the winter months, garden trash remains fairly uniform throughout the year due to accumulations of leaves and winter prunings of trees and shrubbery.

Five years ago, the City Council passed an ordinance requiring the payment of a fee for garbage service, including a section guaranteeing the removal of trash. The section calling for trash collection immediately caused a deluge of demands for immediate trash removal. Citizens who had formerly hauled their own trash accumulations to the public dumps began to request collection service. Trash burning, from a previous ordinance, required a special permit by the Fire department and could be revoked upon the complaint of a neighbor.

As it was impossible to give everyone immediate service upon demand, there were accusations of favoritism in scheduling—one section of the city accusing the administration of servicing another section more often than theirs; and one citizen accusing another of wielding influence for special collection. There was a general discontent all over the City.

The phone in the office of the superintendent of refuse collection was as hot as a firecracker. No sooner would the office clerk lay down the phone than it would start ringing again. There were also stacks of requests or demands in the offices of the Director of Public Service, City Manager, Mayor and Councilmen.

This condition existed through 1949 and on into 1950, when it was decided that something had to be done.

Setting up a Procedure

First it was necessary to set up a trash collection schedule that would not interfere with garbage collection.

Since St. Petersburg's principal

T. E. GOODROW,
Sup't., Division Refuse Collection,
St. Petersburg, Fla.

industry is tourism, as is most of the cities in Florida, there are great fluctuations in population as well as in garbage collection, and the fluctuations are monthly as well as periodic.

Surges in collection required a flexible system to take up the shock. It was not practical to hire and lay off at the beginning and end of seasonal increases, and some means had to be devised to keep the manpower stable and maintain a realistic program of trash collection that would be economical and reasonably satisfying to the taxpayers.

With the fluctuations in garbage production, it was economically impractical to attempt to maintain a rigid trash collection schedule using a minimum of manpower and equipment. Trash trucks had to be pressed into service to replace broken down garbage trucks and to help trucks whose runs had increased to more than they could handle.

The City was well equipped to provide this flexibility in that it

had loadpacker type trucks which were used exclusively for garbage and water-tight scow type bodies provided with tarpaulins.

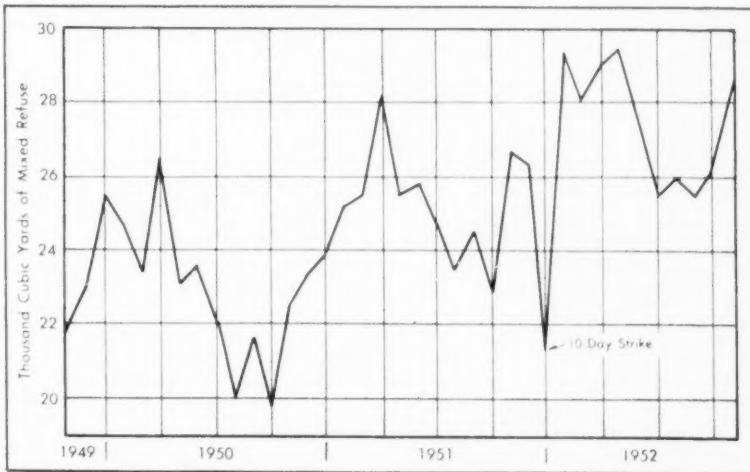
There were hardly sufficient loadpackers to cover all garbage routes during minimum periods of collection. However, a sufficient number of scow type trucks were available to fill in during maximum periods and to maintain some semblance of a trash collection schedule. By properly stacking the garbage they were capable of handling up to twelve cubic yards of material; and they could also haul a considerable amount of trash, such as tree limbs and shrubbery trimmings. Therefore, these scow trucks were used as shock troops filling in the gaps wherever needed.

Public Relations Program

In order to make a trash collection schedule that was flexible it was necessary to inform the public fully as to our problems and plans.

The aid of the local papers was sought and they agreed to help in any way that they could. The papers felt that such a program would present a good news feature and would also be a real public service.

The first article published showed a map of the City split up into areas and explained the se-



● VOLUME of mixed refuse by thousands of cubic yards collected monthly.

quence of collection that was to be followed. The areas were chosen with an eye to keeping collection vehicles from crossing principal traffic arteries and unsettled areas. Citizens were informed that daily notices would be published in the local sections of the papers showing where the trash pick-up would start each day. By following these daily notices the public could trim in advance of collection and there would be no need for unsightly piles of trash to litter the streets and alleys.

Shortly after these articles appeared phone calls began to diminish but not as fast as was desired. Even though the results of publications were a little disappointing

posal site at the end of their day's run with only small amounts of garbage. Since the survey was made during the summer months when many of the tourists, or winter residents were away, it was not considered advisable to change the routes in all cases. Those crews whose routes were not changed were instructed to finish all loads with trash collected from the immediate area where the day's garbage run ended. The city's use of the land-fill method of garbage disposal made this possible. (2) That a great majority of the people were not making use of a second can for accumulations of leaves, grass and small hedge trimmings as allowed by City ordinance. Again it became

ment houses and trailer parks for additional cards to be placed in conspicuous places for their tenant's observations.

Prior to the issuance of instruction cards, newspaper articles appeared explaining what was about to take place and endorsing the procedure. Results from the cards were striking. For the first few weeks a few phone calls were received inquiring about schedules or seeking clarification of the program. Gradually calls dropped off until now only a few are received each day. These calls are with few exceptions satisfied with the explanation given by the clerk.

St. Petersburg's biggest headache was changed from migraine to less than acute through the cooperation of the newspapers, with public participation and by extra effort on the part of the crews and administration. Even though at the present time very little more trash is hauled in proportion to population increase than was hauled prior to the introduction of a system very few complaints are received. Our present rate of trash collection is approximately once every ten weeks. It is the aim of the department to reduce this to once every four to six weeks as soon as possible. It is believed that it is not economical to collect more often than once every four weeks. With a good public relations program this should give satisfaction to the taxpayers. Very few people will trim hedges and trees more often than once or twice a year. Palm fronds, in the semi-tropics, will give the greatest trouble for they shed constantly especially during periods of high winds.

• • •

"Progress Memorandum" Form Helps in Administration

A "Progress Memorandum" form has been sent us by George F. Costello, City Manager, Lake Alfred, Fla. With this, the actual progress on each project undertaken is recorded step by step. The value is 3-fold: (1) It provides an incentive to continuous work until the project is completed, avoiding delays in progress as shown by a date column at the left. (2) It is a valuable asset in preparing reports. (3) It provides a permanent record useful for future reference. One or more pages are used as needed. When the project is completed, the final page is so endorsed, with the date, and the sheets are filed.



● "TOPPING-OUT" loads of garbage with trash, as leaves, grass and hedge trimmings, plus public relations, changed the headaches to a much less violent form.

the administration was cognizant of the fact that public relations take time and that it is difficult to change old habits.

Survey of Collection

Before proceeding farther with public indoctrination it was decided to make a complete survey of the garbage and trash collection program to pick up the loose ends and increase the efficiency of the service. Particular attention was paid to the number of cans picked up by each collection unit, the number and type of containers used for trash, and the routes followed by the trucks.

This survey showed: (1) That trucks were often going to the dis-

necessary to further our public guidance program.

To make a more direct contact with each resident it was decided to present each householder with a card of instructions. The main purpose of these cards was to encourage the use of a second can for small trash accumulations. Other suggestions were made as a public service and to improve the sanitary conditions. Enough cards were printed to enable newcomers to the collection service to receive one when such service began.

These cards were then given to the crews who tied one on the can at each residence and place of business. Shortly after these cards were issued the department received many requests from motels, apart-

PROTECTING A Water Main Under a Bridge



● PIPE LINE was relocated and protected at bridge approach by building a culvert.

P. C. KARALEKAS

Chief Engr. & Supt., Springfield, Mass.,
Water Dept.

UNUSUAL protection for a new 36-in. water main extension was necessitated when the Massachusetts Department of Public Works constructed its new South End Bridge in Springfield.

Water is brought to the city of Springfield from its Provin Mountain Reservoir through two lines. One line is of 42-inch diameter; the other is of 54 and 48-inch pipe. These two lines enter the city at the North and South ends.

The South End River crossing is composed of two 36-inch steel lines laid under the Connecticut River. These are joined together at a so-called East terminal chamber located on the bank of the Connecticut River and in the vicinity of the new South End Bridge.

To strengthen the distribution system of the Water Department in the southern part of the city, a project for the construction of some 10,000 feet of 36-inch prestressed Lock Joint pipe has been provided, with construction starting at this East terminal chamber and continuing to a point in the city called "X". With the location of the proposed

South End Bridge set some 250 feet south of the river crossing and terminal chamber, it became necessary to re-locate the proposed 36-inch pipe line; and, also devise methods of protecting it since one of the ap-

protect the pipe line against excessive weight, to provide access to the line in case of necessary repair or other maintenance, and to protect the new approach from danger should a leak occur in the water line, it was determined that this line should be placed in a concrete chamber or culvert for its full length under the fill. This concrete culvert, as designed, has an inside diameter of 9 feet 9 inches by 6 feet 6 inches with 12-inch walls and 15-inch bottom and top. This reinforced concrete culvert is set on piles spaced 2 feet 6 inches on centers over its entire length of 136 feet. The pipe within the chamber is laid on cradles. Manholes are provided on each end of the culvert for entrance as well as discharge of overflow water.

One photo herewith shows the 36-inch prestressed concrete pipe in place with the East terminal chamber in the background. The picture also shows the concrete floor of the gallery, as well as the walls under construction.

The other photo shows another



● FOR INSPECTION and possible cleaning, Dresser joint section was installed.

proaches to the bridge will pass over a section of this line.

The fill to be used in constructing the Northerly approach to this bridge will have an average of 26 feet over the pipe line. In order to

section of the concrete culvert near the East terminal chamber which is in a greater stage of completion. Also shown is the manhole over the 16-inch connection to the

(Continued on page 126)

RADAR CHECKS MOTOR VEHICLE SPEED

If you should be driving through New Rochelle, N. Y., watch your speed for a radar speed detector is being operated by the police. The location of the apparatus varies from time to time and the citizens of the city are becoming very speed conscious. The object of the campaign is not to arrest a lot of people but to get across the idea that excessive speed does not pay.

The radar equipment requires two cars and four men for operation. In New Rochelle an ordinary car is used for the radar apparatus. The black box containing the radar is set up at the rear of the car, and the beam aimed to intercept the traffic stream from 200 to 300 feet behind the car, which is parked at the curb. The radar beam checks the speed of objects passing through it and the speed, in miles per hour, is indicated by a pointer moving along a scale. The speed is also marked on a chart so that the maximum speed at any particular time at that location is recorded. The entire apparatus is operated by current from the battery in the car.

A second car, a police car this time, is located about a quarter of a mile along the street with two officers. The two cars are connected by radio phone.

At the radar car, one man keeps an eye on the speed indicator and the traffic. As he gains experience he can judge the speed of the approaching cars and pick out the fast ones. As the speeding car approaches he calls out the speed and a description of the speeding vehicle to the officer in the car. For example, "Green Pontiac, man driving." The officer in the car transmits the description by radio phone



● RADAR equipment in parked car.



● BLACK BOX measuring car speed.



● TRAFFIC as the radar sees it.



● OFFICER receives car description.



● CHART records passing car speeds.

to the police car down the street with the speed and the time. The two men handling this job must be very alert since the time to do the work is counted in seconds rather than minutes.

An officer steps out into the street, stops the car and directs it to the curb. The conversation starts, "You have been checked by radar going 42 miles per hour at 9:42". Consternation and dismay is the usual reaction but a ticket is prepared and given to the driver.

Remember how one slows down when a traffic officer appears? It won't work with radar since even if the apparatus is seen, it is too late to do anything about it as the speed has been recorded. The answer, of course, is to keep the speed down at all times.

The activity of the radar squad is well publicized in the local newspaper, although the location of the apparatus is not announced. Generally the squad will be at three or more locations during a working day. A very accurate record is kept of every violation giving the speed, time, location and any other pertinent facts including the comments of the motorist. These speeding cases come before the City Court in the usual manner. Most motorists plead guilty and pay without protest.

The radar apparatus was purchased from the Automatic Signal Division, Eastern Industries, Inc., East Norwalk, Conn., and cost just over one thousand dollars.

The police traffic department believes that soon it will be necessary to operate the radar equipment only at times when complaints concerning speeding at particular locations are received.



● FINAL — "Let's see your license."



● STAKING the flow-line—one method of preventing excessive ditch erosion.

EROSION CONTROL ON HIGHWAY SLOPES

M AINTENANCE of road slopes is an expensive item in general highway maintenance. Soil eroded from a cut slope is usually deposited so as to block drainage ditches, culverts and underground drains, or directly on the pavement, thus causing serious hazards to traffic and often damage to the pavement. The cost of cleaning up this material is a considerable item in all road maintenance budgets. In addition, an eroded cut slope is unattractive in appearance. Many methods of control have been tried and the following is a brief description of several.

Diversion and Intercepting Ditches—The most common method of reducing the amount of run-off water pouring over the cut slope is to construct an intercepting ditch at the top of each cut slope. This restricts the amount of run-off water which would cause erosion on the slope and limits soil loss to that caused by the water falling directly on the slope face. These ditches lose their value, however, if they are not kept clean to allow the free flow of water.

Low cuts are not subject to serious or rapid soil loss. Run-off water accumulating on low cut slopes does not attain volume or velocity enough to move much soil, although the process of soil loss, while slow, is sure. If high cuts are broken up into a series of low banks or terraces, the same soil loss characteristics will apply. The terraces must be so constructed that they will intercept run-off water and lead the water to one side where it can be carried to the bottom of the cut in paved ditches or pipes. The terrace method works very well, provided the terraces are kept clean so that they drain at all times. The chief objection to this method is that the construction is too expensive for any but exceptional cases.

Vegetative Cover

The most natural and attractive method to control erosion on cut slopes is to establish a solid vegetative cover. Since the angle of repose of loose soil is about $1\frac{1}{2}$ to 1, it becomes necessary first to flatten all slopes to a minimum of $1\frac{1}{2}$ to 1. The flatter the slope the more successful erosion control methods will be. A layer of top soil is usually necessary to support the grass or other vegetative cover. The subsoil slope face should be roughened before the topsoil blanket is spread over the slope. This provides a bond between the topsoil and subsoil and will aid in holding the topsoil in place. The topsoil blanket should not be over three inches in thickness since it has been found that loose topsoil spread thicker than three inches will, when saturated during periods of heavy rain, slide to the bottom. A topsoil cover slightly less than three inches in thickness will give as satisfactory results as a thicker blanket since density of growth, not size of the individual plant, is the desirable condition.

A combination of $1\frac{1}{2}$ to 1 slope, or flatter, well roughened cut face; a relatively thin layer of topsoil, seeded with good grass seed, properly mulched; and with mulch secured to prevent blowing away, will give adequate protection under normal conditions. However, if a heavy and prolonged rainfall occurs (2 to 4 inches in 24 hours) before the grass is established, some slippage and erosion may occur.

On soils which have high erosive tendencies the treatment just described is insufficient. To solve this problem successfully, straw should be added to the topsoil before seeding and a sheepfoot roller used to compact the straw into the topsoil, thereby increasing the water-holding capacity. The former procedure of driving stakes through the top-

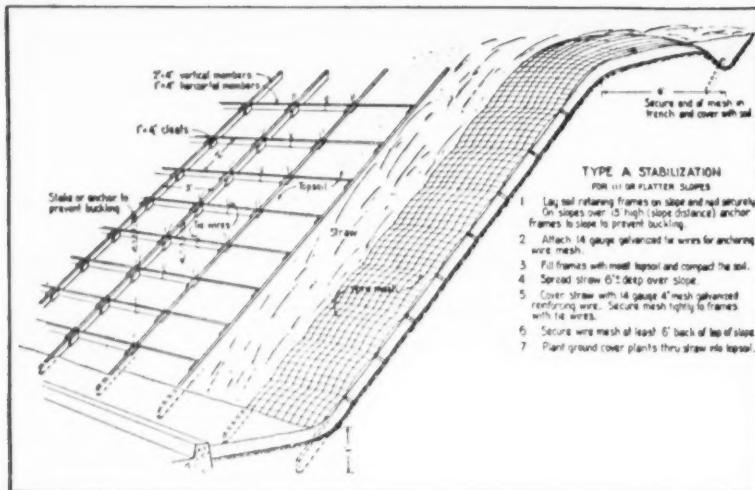
soil layer into the subsoil, in an attempt to anchor the soil and straw in place, has produced the opposite effect of increasing the tendency toward saturation and slippage of the topsoil.

Erosion Control on Fill Slopes—Erosion on fill slopes generally continues unnoticed until it reaches major proportions and begins to endanger the highway. By that time extensive repairs are necessary.

Many raw new fill slopes of soil, which is not highly erosive or very infertile, can be stabilized effectively and with economy by seeding the fill before rain has compacted the soil. Straw mulches and fertilizer can be used to protect the slope until the grass is well established. Old fill slopes that have been consolidated and gullied by rainfall before being seeded generally produce poor results under this procedure unless the gullies are filled and straw or other humus worked into the surface to prevent gullies from redeveloping.

In cases where the fills are made of highly erosive type soils, more elaborate measures of control must be taken. Straw is often used to stabilize the soil. After the degree of slope has been established a layer of straw is put in place. A sheepfoot roller is then run over the completed slope to compact the soil and to incorporate the straw into the top layer of soil. The roller will leave a few inches of loose, uncompacted soil on the surface but this loose soil is mixed with the straw, forming a good seed bed. If needed, fertilizer should be added before the straw is spread.

On deep fill slopes composed of highly erosive material, an additional anchoring effect is needed. This is usually attained by the use of wire-reinforced brush mats, straw or wire mesh mats, or brush layers installed during fill construc-



● **SLOPE** stabilization methods: Wire mesh shown at right and wood frames at left.

tion. All types are placed flat, on a contour level, with the outer edge of the mat or layer flush with the surface of the fill and the inner edge buried about 5 feet in the solidly compacted fill material. The mats are then covered with straw and topsoil and compacted with a sheep's-foot roller. The mats and layers act as screens or filters if the surface straw protection breaks down. If gullies start to form, the mats or layers are exposed and by filtering and decreasing the velocity of the water, will tend to reduce the amount of damage. The outer edge of the mat should be left flush with the surface of the fill slope to permit the use of a sheep's-foot roller in compacting the loose surface material and embedding the straw in the soil.

Control on Highway Shoulders—In most cases shoulder erosion is not a serious problem but may occur during the first year after construction and before the shoulder has become stabilized. Damage to pavements caused by shoulder erosion may amount to a considerable sum, if allowed to go unchecked. There are several ways by which erosion on highway shoulders may be controlled. Some of the most effective are (1) surface the shoulders with several inches of gravel, stone or slag, (2) mulch and seed the shoulders in order to establish a turf, and (3) treat the shoulder with bituminous material. Expensive treatments, such as topsoiling and planting of elaborate turf, is not necessary except under extreme conditions or in highly developed public-use areas.

Control in Drainage Ditches—

Erosion in intercepting and drainage ditches is potentially dangerous to the highway and causes an undesirable appearance. In the past, little attention has been paid to the proper construction of these ditches and, as a result, major erosion problems occur. A V-shaped ditch cut deep into the subsoil is an open invitation to erosion. Methods of control are simple and inexpensive. They are:

1. The grade of ditches should not exceed 2 percent. The steeper the grade the greater the velocity of the water and the greater the soil loss from the ditch.

2. Never cut a ditch in the sharp V shape. Such ditches usually cut deeply into the subsoil where vegetation has a difficult time to become established. As a result, each storm cuts the ditch deeper, making control more difficult and expensive.

3. Whenever possible, form the ditch in a broad V shape. Such ditches do not cut deeply into the

subsoil and reduce the amount of water carried in a single channel to a minimum. The bottom of the ditch should then be cultivated, fertilized, and seeded with a quick-growing annual grain so that protection is provided the first year after construction. Native windblown seeds will be caught by the grain and will quickly establish a permanent cover.

4. The construction of contour ditches at the ends of cut slopes will take run-off water into dispersal areas without soil loss.

5. Where erosion has occurred in roadside ditches, the following control measures can be taken:

(a) Pack cut brush, supplemented with straw, into the ditch in order to filter the soil and slow up the runoff water to a point where it reduces the cutting action to a minimum.

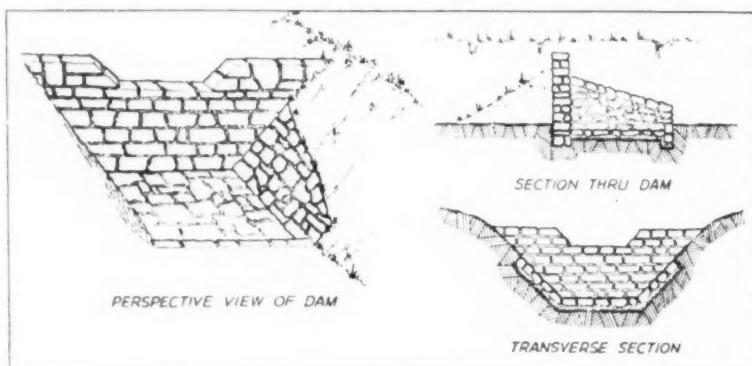
(b) In deeply eroded ditches, construct check dams placed in such a manner that the grade from the foot of one to the top of the next does not exceed 2 percent. Such dams may be made of concrete, stone, logs or other available material.

(c) Where the right of way widths permit, and the eroded ditches are not too deep, regrade into a broad U shape.

Maintenance of Highway Slopes

Too often, maintenance crews forget or ignore highway slopes after the initial slope stabilization has been accomplished. Unfortunately, most slopes cannot be ignored for several years. A good maintenance program will provide for regular inspection, funds to repair damage caused by excessive rainfall, or by heavy freezes, and a regular program of fertilization until the slopes

(Continued on page 125)



● **MASONRY** dams, using local materials, can be used for retarding ditch erosion.

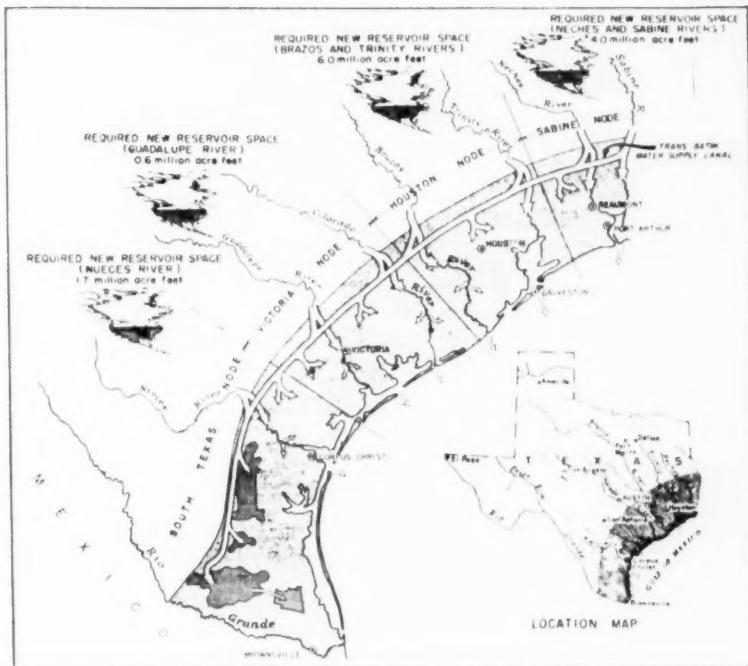
A suggested solution of TEXAS' WATER PROBLEM

Texas, being the largest of the states, naturally has the widest divergence of climate. This applies to its rainfall, among other phenomena, which varies from annual totals averaging less than 10 in. in the far western corner to over 55 in. in the far east. Also there is wide variation, from year to year, from the state average of 27 in. In 1919 the average for the state was 45.6 in., but was only 16.2 in. in 1917. In October 1952, the average for the state was 0.03 in. The flow in the thirteen rivers which carry the runoff to the Gulf varies even more widely. The total water so carried to the Gulf in 1941 was over 53 million acre-feet and in 1939 was 10½ million. The minimum recorded inflow to the Gulf was 4,611,000 acre-feet.

Present Texas usage of water, about 7.7 million acre-feet annually, is only about 15% of the average annual discharge of streams bordering on or originating in the state, and 85% of this is used for irrigation. In spite of this, variations from the averages are so great that some sections of the state have more water than there will be any foreseeable need for, while others have far less than even their present requirements. Also, the former areas experience years when the rainfall is inadequate for even present needs. Most streams in the eastern 70% of the state cause flood damage, except where controlled. The Federal Government has built 11 dams for flood control, 7 of these serving also for water supply. In general, each of these has been built as an independent project to meet a local need.

The Bureau of Reclamation of the Dept. of the Interior has recently published the result of a comprehensive state-wide study of the probable future requirements for water if the state is to develop to the full its natural resources for agriculture and industries (including the new petro-chemical industry), and meet the demands of cities for public water supplies. Also studied were the available supplies, both surface and ground, and the means of distributing them where most needed.

The problem divides itself into four geographical areas. That of the northern part of the state can



● CANAL 500 miles long, intercepting seven rivers, may solve Texas water problem.

be solved by ordinary methods of stream control. The western arid area seems to offer no possibilities of increasing its present consumption by further development of either surface or ground water sources, and importation of water from other areas is considered infeasible. In a large part of the large central area the locally available water resources are more than adequate to supply potential requirements, if developed and apportioned by standard methods now being applied. In the northern part of this area much of the surface water is impotable and there is little ground water available; but sufficient usable water is available for municipal use with storage and multi-city distribution.

Special attention has been paid to the Gulf Coast area. Although comprising only 11% of the area of the state, it contains 28% of the population and produces 30% of the state's total income. Most of the state's large water-using industries are concentrated here, including petroleum refining, petro-chemical

industries, and production of synthetic rubber, sulfur, chlorine, magnesium, tin and zinc; also here is located much of the state's irrigated acreage. This area at present uses almost 4 million acre-feet annually. It is estimated that future developments of industries and population and irrigation will require 12.9 million acre-feet annually. This amount is available, but to utilize it will require 12.3 million acre-feet additional storage, estimated to cost \$370,000,000; a supply canal the entire length of the Gulf coast—about 500 miles—to collect the surplus at various points and convey it to those where there is a deficiency, estimated to cost \$680,000,000; and irrigation systems costing \$50,000,000.

It is estimated that this would furnish the water needed by industries calculated to produce an annual additional income of \$5,539,000,000; and for irrigation producing \$415,000,000 additional income.

The construction of the trans-basin canal, while a work of some magnitude, presents no formidable physical barriers, and is simple.

Diesel-driven pumps reduce Drainage District Costs

INSTALLATION of three new 48-in. Fairbanks-Morse vertical, propeller pumps driven by 375-hp. F-M diesels has saved Indian Grave Drainage District in Quincy, Illinois, more than 34 percent in pumping costs. Installed because of the lack of capacity of the original, electric-motor-driven equipment and because of an impending increase in purchased power rates, these new pumps, with their increased efficiency, have reduced horsepower-hours per unit of water pumped by some 25 percent. In 1952, with the new diesel-driven pumps in service, total cost per acre-ft. was 24.6 cents. If the pumping had been accomplished with the old electric-driven pumps at current power rates, total pumping cost would have been at least 37.4 cents per acre-ft.

Organized in 1880 under the Levee Act of Illinois, the District is designed to permit the farmers to get a crop each year from what was formerly marginal land along the banks of the Mississippi. Serving an area of 18,300 acres, the District drains a watershed of 20,112 acres and is responsible for an annual increase in crop value of \$10 per acre.

Some time ago, the District was notified that 25-cycle equipment then in use would be replaced and that the previously favorable rate schedule for nighttime pumping operations would be increased approximately 47 percent. This gave the District three choices: 1) purchase new electric motors and switchgear and face a 47 percent increase in power costs with inefficient pumping equipment; 2) con-

WILLIAM H. KLINGNER,
Consulting Engineer, and
M. B. CARROLL, JR.

struct an entirely new electrical plant with new pumping equipment to operate at the increased power rate; or 3) construct an independent diesel plant. W. H. Klingner, consulting engineer of Quincy, Ill., was retained by the District to make a study of the three alternatives. Engineering and cost studies showed that the case for the entirely new diesel-operated plant offered the greatest savings over a 20-year period with lower operating costs than offsetting the higher initial investment.

The plant was designed to handle 180,000 gpm. at 16 ft. head. It incorporates Fairbanks-Morse 48-in. submerged propeller pumps. These are powered by 375-hp FM 5-cylinder diesels driving the pumps through Farrel-Birmingham right-angle gear drives. One unit is considered a standby unit, except for emergency peak conditions, based upon the following design loads: 0.395 in. off the watershed in 24 hours at 22 ft. TDH; 0.420 in. off the watershed in 24 hours at 16 ft. TDH; 0.520 in. off the watershed in 24 hours at 10 ft. TDH. The decrease in TDH accompanying the increase in anticipated rainfall is based on the assumption that the level of the river will not rise as fast as the level in the District; and on the assumption that higher water levels

within the District are permissible during periods of heavy rainfall.

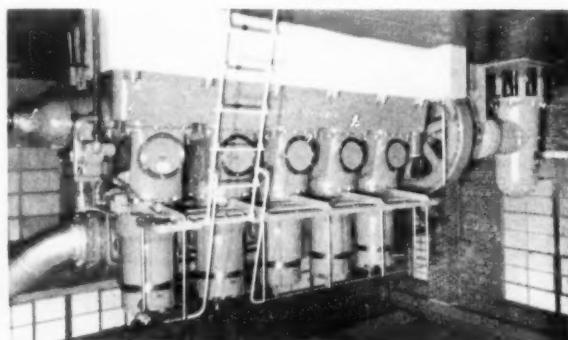
Construction of the plant was accomplished in 1951 and 1952 by J. M. Foster & Co. of Gary, Indiana. The first unit was put into operation in August, 1951, and it immediately picked up the entire pumping load. The remaining units went into service in the summer of 1952.

Operating costs have been reduced with the diesel installation and are not only lower than previous operating costs when running the electrically-powered pumps but are also much lower than would be possible even with new and highly efficient electrical equipment. Drainage district costs are generally computed on the basis of cost per acre-ft. of water pumped. In 1952, the first full year of pumping with the new pumps, total costs exclusive of dike and ditch maintenance amounted to 24.6 cents per acre-ft.; the plant pumped 24,332 acre-ft. of water.

Of interest is the reduction in horsepower-hours required for pumping a given amount of water. In 1946, the 200-hp. electric motors operated at an average of 37.5 rated hp. hr. per acre-ft. pumped. In 1952, the 375-hp. diesels operated at an average of 34.0 rated hp. hr. per acre-ft. pumped. This is a reduction of 9 percent. Actually, rated hp. hrs. do not tell the whole story. In 1946 the electric motors used 21.2 kwh. of purchased power per acre-ft. pumped. Diesel performance was not in electrical units, of course, but fuel consumption was 1.13 gal. per acre-ft. pumped in 1952, indicating a reduction of at least 25%.



● PUMP intakes are protected by screens of heavy bars.



● ONE OF the three F-M engines; angle drive shown at right.



Pay-As-You-Go Paving Project

B. H. CRUCE
City Manager
Pampa, Texas

WE need a lot of paving, but it's going to take a bond issue," is a common expression of mayors, councilmen and city managers. But a pay-as-you-go paving plan is possible and one was worked out by the citizens of Pampa, Texas, back in 1946.

Pampa is a small city in the heart of the industrial section of the Texas Panhandle, and it experienced considerable growth during the war years and immediately after World War II.

In 1946, the people were demanding paving so strongly that they were willing to pay 100% of the cost if necessary. That feeling made it easy for the city fathers and citizens to agree on a financing plan that has grown more popular each year.

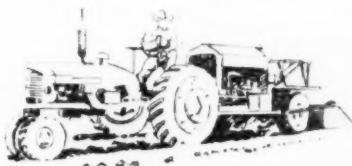
The City owned some street maintenance machinery and a dumping ground that contained a large quantity of sandy caliche.

"Why not," someone suggested, "let the City furnish the machinery and base material and the property owners pay the balance."

The idea sounded good and was investigated. The caliche contained too much sand to make a hard roadbed. It needed more clay or other binding material; however, the material had been used on local streets both as a straight caliche base and as a soil-cement base. The soil-cement paving had held up so much better than the straight caliche base paving that the City Commission decided in favor of the soil-cement

type paving. After adding cement as the binding material, the paving is finished with a two course asphalt topping.

Engineers from the Portland Cement Association were called in to study the base material and suggested mixtures that would produce the best and cheapest paved streets.



It was upon their recommendation that the City settled on a mixture of 8% by volume.

The City Engineer made a detailed estimate of the cost of paving in accordance with the specifications. From his estimate, it was learned that rental of equipment (using city owned equipment), plus operations and maintenance, engineering work and base material—estimated at 5¢ a cubic yard—would equal one-third or more of the total cost, with only a part of this being out-of-pocket money to the City.

The City Commission agreed to furnish the equipment then owned and to purchase additional equipment recommended by the City Engineer. It also agreed to pay for operations and maintenance of the equipment and to employ an engineering staff to lay out grades and inspect the work in progress; and to furnish the base material.

The property owners were called upon for the remaining cost. Two-year notes are given for front streets and four-year notes for side streets. Homestead owners are required to

pay 10% down and sign notes for the balance or pay 100% cash. Others are assessed. According to Texas law, an assessment against a homestead is hardly worth the paper it is written upon. For this reason, it is necessary that a voluntary note and mechanic's lien be signed by homestead owners. Non-homestead property can be assessed and be sued for failure to pay the assessments.

We have found there are a number of problems to be solved before the Public Works Department can be given the green light on a unit of paving. The City Commission adopted three policies that are very good as to the over-all program but they created bottle-necks in the program.

The policies were: no street would be paved without curb and gutter; there would be no leave-outs; and that all paving must connect with paving.

Sometimes a two- or three-block unit would be signed up except for one property owner, a homestead owner. If this reluctant property owner was in the first block next to the existing pavement, his refusal to sign a note or pay the assessment in cash before starting the project would cancel out the whole three-block unit. If he was in the second block, then he nullifies only two blocks of the paving and so on. The problem is left to the neighborhood and sometimes it manages to sell or put sufficient pressure on the reluctant property owner to get him in line. Out of town property owners in this class were contacted by mail and telephone by friends. Most of the out-of-town property owners created a problem. They are not as interested

in securing paving in most cases as are the people living on the street. Several letters are usually necessary before some agree to join in the program. Owners in the Armed Forces and over seas are especially difficult at times to get "signed up."

Persons on Old Age Assistance are problems at times. Some are not financially able to make the down payment and meet the monthly payments. In some cases such as these, neighbors have paid the entire cost for the pensioners. Many blocks of streets, however, are without paving because homestead property owners are unable or unwilling to go into the program. "Leave-outs" are almost an impossibility in soil-cement paving; therefore, a block is skipped rather than pave only a portion of it.

Work on the first block of post-war paving was started in 1947, a year after the Pay-As-You-Go Paving Program was officially approved. But before that first block of paving was underway, the fund from property owners exceeded \$20,000, enough to pay for eight or nine 300-foot blocks. The price in 1947 was \$3.95 a front foot. The price today is \$4.25 a front foot. This also includes the cost of concrete curb and gutter.

The collections have been as follows:

1947	\$ 21,412
1948	66,338
1949	117,858
1950	81,383
1951	90,248
1952	161,495
1953 (six months)	93,598
Total	\$ 612,332

Since the Pay-As-You-Go Project started, almost two hundred 300-foot blocks have been paved; fifty-five blocks were paved in 1952 and approximately forty-five will be paved in 1953.

In 1952, the City had to purchase 3.5 acres of additional land to secure sand and caliche for the paving project. The old site was becoming fast depleted. The additional land was purchased by money from the General Fund. Each year, the General Fund Budget includes salaries for the Engineering Staff, machinery operations and machinery maintenance.

In 1951, a $3\frac{1}{4}$ -cy. loader was purchased on time warrants. A larger loader, $1\frac{3}{4}$ -cy., was purchased in 1952 on time warrants; and in 1952

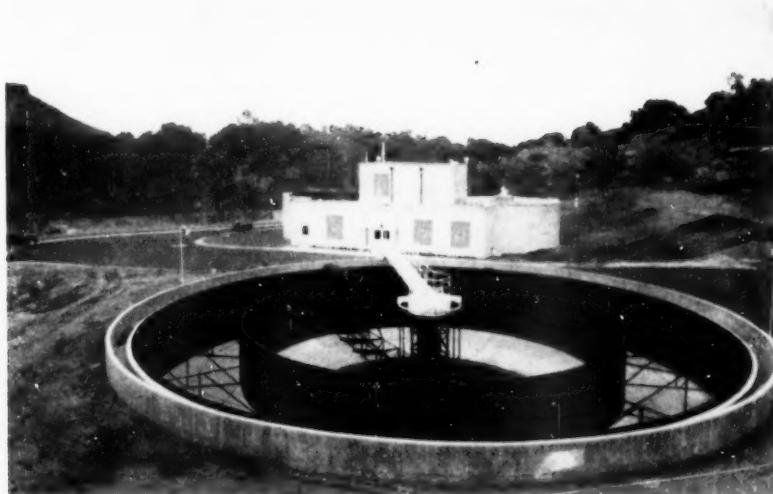
(Continued on page 116)

Cost Of Paving A 300-Foot Block And One Intersection

			City's Contribution
Curb and Gutter:			
Frontage	600'	Total Cost	
4 Returns & 2 Valleys	344'	\$ 750	
Returns	75'	148	
		94	
	Total	\$ 992	
Moving Dirt: (Avg. 630 c.y.)			
Maintainer	12 Hrs. @ \$10.00	\$ 120	\$ 102
Loader	20 Hrs. @ 10.00	200	170
Truck Time	60 Hrs. @ 2.50	150	90
	Total	\$ 470	\$ 362
Moving Base Material: (Avg. 480 c.y.)			
Loader	17 Hrs. @ \$10.00	\$ 170	\$ 144
Truck Time	82 Hrs. @ 2.50	205	123
Maintainer	7 Hrs. @ 10.00	70	60
	Total	\$ 445	\$ 327
Base Material:			
Average 480 Cubic Yards @ 5¢		\$ 24	\$ 24
Stabilization:			
Cement	513 Sacks @ \$1.20	\$ 616	
Spreading & Unloading		75	\$ 30
Water Truck	12 Hrs. @ \$ 4.50	54	15
Maintainer	12 Hrs. @ 10.00	120	102
Tractor	24 Hrs. @ 4.00	96	72
Bulldozer	12 Hrs. @ 6.00	72	60
Seaman Mixer	8 Hrs. @ 6.00	48	40
Rollers	16 Hrs. @ 2.00	32	32
Distributor	6 Hrs. @ 10.00	60	45
Extra Labor	24 Hrs. @ 1.25	30	
Primer, 350 Gallons	15	52	
Clean-up and Misc'l.		100	
	Total	\$1,355	\$ 396
Asphalt Topping 1400 s.y.		360	
Engineering & Overhead	5%	182	\$ 182
	GRAND TOTALS	\$3,828	\$1,291



● CONCRETE curb and gutter construction precedes street paving operations.



● CLARIFIER and aerator of the Coors plant at Golden before starting operation.

INDUSTRIAL WASTE PLANT TREATS DOMESTIC SEWAGE

DESIGNED and built by an industry for industrial waste treatment, this plant also handles the domestic sewage from the city of Golden, Colo. The industry is the Adolph Coors Co., which produces beer, malted milk and fine scientific porcelain ware. Designer was Ed Edlund, head of the company's engineering department; construction was under the direction of Ralph Besel, head of the company's construction department. Operation is now under the direction of Howard Lewis, formerly of Colton, Calif. Operation started last August. Total waste volume now ranges from 0.8 to 0.9 mgd; at the time of this writing, insufficient data had been obtained in operation to determine the effect of the brewery wastes recently added.

Golden had a 1950 population of about 5,300. There is reserve in the new plant to permit doubling of the capacity of the Coors plant and doubling of the population.

The incoming wastes pass through Chicago comminutors and then into a Process Engineers clarifier-oxidator 90 ft. in diameter and 12 ft. deep. The brewery wastes and those from the malted milk plant constitute the larger portion of the wastes to be treated. The sewage from the city of Golden is brought to the plant by an outfall sewer

roughly a mile long, which was built by the city. This is the only part of the entire system which was financed by the city, the treatment plant having been paid for by the Coors Co. Information is not yet available in respect to the methods or amount of payments by the city for the treatment procedures, but it is expected that these will be based in part, at least, on volume and strength.

Air is applied in the clarifier and the sludge is also aerated before discharge to the digesters, which are of the multiple type, furnished by Dorr Co. Sludge digestion is in two stages, with the primary tank held at about 137 F to attain thermophilic digestion. Excellent insulation has been provided for the primary digester in the form of 4 inches of cork. Heat is supplied by the direct injection of steam from a 5 hp boiler into a mixing tube discharging into the center of the primary digester. Gas resulting from digestion is burned to produce the power and heat to run the plant. Instrumentation is by Builders Providence.

Essential features of the plant, as stated by the Coors Co., are: (1) Combining coagulation and settling with bacterial digestion of the dissolved solids in the same tank; (2) concentration of the sludge from 2 percent solids to 10 percent before

digestion; and (3) the use of thermophilic digestion.

Further the Coors Co. states: In designing the plant, Coors engineers were concerned about the problem facing small communities now discharging sewage into streams. It was the Coors idea to work out a design basis for a versatile experimental plant to develop the cheapest methods for sewage disposal. The theories used in the design of this plant were tested in pilot plant operation. If the operation turns out as expected, the cost of small disposal plants can be cut by nearly 50 percent. Coors will also offer the use of the plant as a laboratory to all Colorado universities training sanitary engineers, and also hopes to train and develop qualified operators of disposal plants for communities.

In a letter to the Editor, William N. Gahr, Director of the Division of Sanitation, State Department of Health says: "This is a nice plant. . . . Essentially it is better than the straight primary process because air is introduced into the clarifier and is also added to the raw sludge prior to putting it into the primary digester. . . . The very interesting part about this plant is the fact that it is owned and operated by an industry which is willing to take and treat the domestic wastes of a community of some 7,000 population."

Pavement REHABILITATION in OREGON

RAY WEBBER, MASCE, Assistant Construction Engineer, Oregon State Highway Department



● MEASURING the permeability of the finished pavement.



● CHECKING the wet skid resistance of the pavement.

THE unpredictable increase in traffic volume in this state during and following World War II has made it necessary to rehabilitate many miles of roads. Generally such work consists of leveling the surface with asphaltic concrete or of applying a seal coat with non-skid properties in instances where the road surface is not unduly rough.

The principal need for pavement rehabilitation might be based upon two factors: (1) Transition from light to heavier traffic volume, with resulting distortion in the pavement surface; (2) Age deterioration or hardening of the asphalt in old pavements and wear which produces slick and dangerous surfaces.

Many skid tests have been conducted throughout the state. From these it has been found that the ideal skid-resistant surface is one with a sandy texture. Surfaces offering low resistance to skidding are best improved by means of an application of asphalt emulsion at rates between 0.15 and 0.2 gallon per square yard, followed by an application of $\frac{1}{4}$ -inch to No. 10 crushed rock at the rate of 0.005 cu. yd. per sq. yd. If an existing surface contains an excessive amount of asphalt, $\frac{3}{4}$ -inch to $\frac{1}{2}$ -inch rock may be used.

A rehabilitated pavement usually

includes the widening of an existing pavement. Such work generally necessitates the removal of the existing shoulder to a depth required for the base needed to support the traffic on the particular soil or soils involved. The determination of base thickness is determined by means of confined tri-axial testing of the soil through a series of tests within the plastic limits of the soil. Base courses are extended through the shoulder line in order to eliminate any possibility of water being impounded under the pavement. It has been found that shoulder material which has been in place for a considerable period of time sometimes develops a density through which free drainage of water is not possible; a physical inspection is required and removal recommended should such a condition exist.

Design of Asphaltic Concrete Mixes

In the design of asphaltic concrete mixes a graded material with about 6% voids is desired. Materials for mixes are specified to be within a tolerance band of maximum and minimum quantities retained on or passing various screens. Maximum size is $\frac{3}{4}$ -inch. It has been found that a small percentage of voids in

an asphaltic concrete mix is desirable. Such voids offer space to prevent asphalt flushing to the surface. High stability of mixes is not particularly necessary during the construction period. Mix stability depends to a great extent upon the use of the $\frac{3}{4}$ -inch to $\frac{1}{4}$ -inch fraction of the aggregate. We have found that 85-100 penetration asphalt offers the best qualities for a mix in this area, and that 5 to 7 percent asphalt by weight is a wide enough band to meet most requirements.

Slight variations are considered in designing a mix for particular zones or areas. For instance, cool areas will have need of a different mix than hot areas. Also, consideration is given to mixes which are to be placed on mountain grades and flatlands. After a mix has been designed, it is generally tested in a tri-axial machine as a check for stability.

All mixes are designed for minimum leakage of water through the surface. Rare cases are encountered where abnormal leakage will occur on a project. In such instances, a seal coat is applied, using emulsified asphalt with a cover of $\frac{1}{4}$ -inch to 10-mesh aggregate.

Most of the rehabilitation work on Oregon highways is carried on

under contract; however, the Oregon Highway Department operates eight asphaltic concrete mixing plants having capacities of 100 to 300 tons per day. These state plants are strategically located throughout the state and are used to repair pavements which are not in serious enough condition to warrant the award of a contract. Spreading of the asphalt material is generally accomplished by means of a motor blade. Minimum hand labor is used where necessary, generally only at edges of patches. State crews are made up in the spring and continue on schedule through the normal

paving season which usually extends from early May until late October.

Construction practice under contract specifies the use of modern equipment in preparing and placing asphaltic concrete mixtures. On exceptionally rough areas motor grader spreading is done. Following such an operation, a finishing machine is used to insure a true grade, using quantities available from an estimated cover of approximately 2 inches thick. This means that in leveling up the surface the resultant thickness placed on the road will vary at times from $3\frac{1}{4}$ -inch to a

possible 3 inches in exceptional cases. Following the leveling course, there is generally applied a finish course of $1\frac{1}{2}$ inches uniform throughout the project.

Check tests are run on all contract surfacing projects. These include: (1) Standard road roughness; (2) skid coefficient; and (3) surface permeability. It has been found that all of these items are psychologically effective and that they also produce job information. The values obtained from these tests are made available to the contractors and engineers. This information creates a competitive zeal for superior work.



● AFTER the pavement has been finished its riding qualities are determined by means of the roughometer test.



● BITUMINOUS CONCRETE made in a central mixing plant is hauled to the job in motor trucks and spread by mechanical spreaders. On very uneven surfaces, preliminary spreading is by motor grader, followed by a finisher to insure a true grade.

THE
WEATHER
CONSULTANT
• • •



What he can do for YOU

**JOHN R. MURRAY and
DENNIS W. TRETTEL,**
Consulting Meteorologists

It was 9:57 pm on December 1, 1952. Theodore C. Eppig, Superintendent of Sanitation of the City of Chicago, sat watching the snow pile up outside of his office window. Close to three inches had accumulated. He looked again at a detailed weather check sheet on his desk, reached for his telephone, dialed a number and, after a few brief questions, settled back, assured that weather conditions were going as anticipated. A few years ago his plows would have been moving out on a city-wide plowing job. Instead, in this case, additional salting trucks moved out an hour or so later. With the aid of favorable temperatures, the streets were in good condition in a short time. The City was \$25,000 ahead—the difference between the cost of salt and plowing operation and a salting operation alone. This difference was due to the detailed information received from the municipal weather consultant.

Municipal officials can now receive detailed and dependable data to use in planning weather-affected operations. The source of such information is the industrial meteorologist or, if you will, the municipal weather consultant, who is a direct product of the scientific effort of World War II. A detailed and dependable weather forecast was part and parcel of almost every military operation. In war, such

information had to be good; and it had to be detailed.

The job of the meteorologist who is acting as consultant to the city or county is varied. Each weather problem facing the public works official demands a tailored solution. Specific details, timeliness and dependability are key words in solving such problems; and in their solution comes the stretching of the budget dollar. The municipal meteorologist must be capable of answering a question on the advisability of plowing or salting, or a question which deals with paving, patching, oiling or sweeping. To do so adequately, he must have experience in the operation of various types of equipment, in the procedures for scheduling labor, in the methods used in carrying out municipal programs and in the general operating problems of the particular client. With such a background, he can remove a heavy responsibility from the public works administrator.

To issue timely snow or ice storm warnings, his bulletins must go out on a 24-hour a day, 7-day a week basis. Holidays and Sundays are just as important as any other day. Some 250 details must be covered to provide the essential information. Once the preliminary alert, or the detailed storm warning forecast, has been issued, the consultant must maintain a constant watch over the progress of the storm. Any deviations from the original forecast must be sent immediately to the municipal client. There are times when even a few minutes can save hours of additional labor, or even a double

shift. Besides maintaining a 24-hour watch, the municipal meteorologist must be available throughout the storm to answer any snow or ice question which may arise in regard to men or equipment, for despite the basic details of the original warning sheet, each storm brings its own peculiar and sometimes highly local problems.

Winter snow and ice storms are not the only problems of public works officials. When men are sent out to patch streets, an unforeseen rain can cause a total loss of taxpayers' dollars; yet keeping them off the streets whenever the sky looks threatening will never get the job done. Just how the municipal weather consultant fits into this picture is illustrated by the events of a recent June morning. It was raining hard and the 6:30 am radio announced the latest official Weather Bureau forecast as "Mostly cloudy today and tonight, with occasional showers." A couple of years ago, such an outlook might have cancelled blacktop operations for the day. However, on this particular morning, the city engineer finished his breakfast, recalling the phone call he had received earlier from the city's weather consultant, who had told him: "The rain now falling is due to a squall line over the city. Rain will end by 8 am. Some sunshine, with clearing skies and a good southwest wind, will dry the streets by 8:30. There will be more rain after 5 pm, but nothing to interfere with the working day." On the basis of this information, the engineer had notified the asphalt

(Continued on page 102)

How DENVER Controls OUT-OF-CITY Sewerage Connections

DETAILED regulations have been established by the City and County of Denver, Colo., governing connections to the sewer system from outside of the city. Essential requirements are summarized here; and it is believed that a complete copy of the requirements can be obtained by writing the City Clerk or the City Engineer.

All inquiries, applications and negotiations for sewerage service from outside the City and County must be initiated through the Sanitary Engineering Unit of the City Engineer's Office, and all plans are submitted to and examined by this office.

Areas outside the city-county limits not already connected to the sewerage system must execute a suitable form of agreement, termed a "Connector's Agreement." With certain exceptions, such agreements are made only with a municipal or quasi-municipal corporation having the power to install, maintain and

entities, thus facilitating consummation of the Connector's Agreement.

Under such an agreement, the sewer connection will be made at the closest feasible point on the City's system, as determined by the City. The connector pays all expenses of installation at and beyond the point of connection; and such parts of the connector's facilities as are installed within the city limits, becomes the property of the city immediately upon acceptance for use. If the lines within the city limits are not on lands owned by the city, conveyance of title, right-of-way or easement, free of all liens, must be made to the city.

When constructed under a Connector's Agreement, sanitary sewer facilities must be designed to serve adequately the entire area covered by the agreement when it has become fully developed. Plans and specifications must be in accordance with the following requirements and procedures:

Plans must be on a suitable scale, as follows: The plan, one inch to 100 ft.; the profile, one inch to 100 ft. horizontal and one inch to 10 ft. vertical scale. Plans must show adjacent areas sufficiently to indicate the relation of the new construction to existing facilities. A key or index map may be used for this with a scale of about one inch to 600 ft.

The widths of all streets and alleys must be indicated on the plans, and also the right-of-way widths, the width of easements and the dimensions of blocks. Plans must show the location of the sanitary sewers in the streets, alleys or easement areas. Standard position for locating sewers is along the center line of the street, alley or easement. Stakes should be placed along an offset line for construction.

Plans must give dimension, gradient and invert elevations at manholes of all sanitary sewers to be constructed. Gradients must pro-



Courtesy Quickway Truck Shovel Co.

● SHOVEL used by Denver for repairing water mains.



Courtesy Barber Greene Co.

● TRENCHERS can be used for sewer connection construction.

operate a sewage collection system, impose taxes and issue bonds. Exceptions include minor areas which will develop not more than 50 houses. However, where pumping is required, the agreement must be with a municipal or quasi-municipal corporation.

Unless already incorporated, outside areas are required or urged to be formed into one or more sewer districts which can act as corporate

Plans and Specifications

Two copies of all plans and specifications must be submitted, one copy of which will be returned with the approval of the City Engineer. Plans must be from actual field surveys which must refer to land corners or other official survey control points with sufficient accuracy so that the facilities, when installed, can be located readily for service connections, repairs and main-

tenance. Plans must be on a suitable scale, as follows: The plan, one inch to 100 ft.; the profile, one inch to 100 ft. horizontal and one inch to 10 ft. vertical scale. Plans must show adjacent areas sufficiently to indicate the relation of the new construction to existing facilities. A key or index map may be used for this with a scale of about one inch to 600 ft.

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(Continued on page 100)

Elements of Water and Sewage CHEMISTRY and CHEMICALS

(A Continuation from the October Issue)

Normal Solutions

A normal solution contains one gram-equivalent weight of that substance in a liter of solution. A normal solution of sulfuric acid contains 49.04 grams of pure sulfuric acid in one liter of solution. Usually the pure acid is added to distilled water to make up precisely one liter. Sulfuric acid takes up atmospheric water readily and must be tested to determine its concentration.

A normal solution of calcium carbonate contains 50.04 grams of pure calcium carbonate in one liter of solution. A milliliter of the sulfuric acid solution will exactly neutralize a milliliter of the calcium carbonate solution.

A fiftieth normal, 0.02 normal or N 50 solution of sulfuric acid are different names for the same solution. Each contains one-fiftieth of 49.04 grams of pure sulfuric acid in one liter. In the same way one liter of N/50 (or 0.02 normal or fiftieth normal) solution of calcium carbonate will contain one-fiftieth of 50.04, or almost exactly one gram, of pure calcium carbonate.

Other standard solutions, as tenth normal, N/10, or 0.10 normal, are made up the same way; in the case of the N/10 solution, 4.904 grams of sulfuric acid or 5.004 grams of calcium carbonate will be required.

Preparing Normal Solutions

The preparation of a normal solution necessitates the use of a material that can be obtained in a pure state. Sodium carbonate is usually employed. A solution of normal strength or some lesser desired strength is made by weighing out the required amount of chemical and adding it to distilled water. Using this standard solution, sulfuric acid and other solutions are made up by checking against it. Since the procedure requires some skill and practice, it is often better for the small sewage or water plant laboratory to purchase solutions of definite strength already made up.

Solutions may lose strength, or gain it, in time; so before use, solutions should be checked by

titration against solutions by known strength. Their variation from standard strength can then be determined and corrected. In actual laboratory work, solutions are not always kept at exact normal strength, but their actual strength is determined before use and proper allowances are made in the computations.

Molar Solutions

A "molar" solution is one that contains one gram — molecular weight of the substance in a liter of solution. The gram-molecular weight is the sum of the gram-atomic weights of the elements that make up the compound. The strength of molar solutions are indicated in the same way as normal solutions are —M, M 10, M 50 and 10M, for instance.

A molar solution of sulfuric acid contains 98.09 grams of pure sulfuric acid in one liter; an M/10 solution contains 9.809 grams; an M 50 sulfuric acid solution contains 1.9618 grams of pure sulfuric acid in a liter. In the case of compounds that have two replaceable hydrogen atoms, such as H_2SO_4 , and NaCO_3 , the molar solution is just twice as strong as the normal solution, and an M solution is the same as a 2N solution. Where there is but one replaceable H atom, as with HNO_3 , HCl and NaOH , the gram-equivalent and the gram-molecular weights are the same and the molar and normal solution are of the same strength.

Valence

The quality or power of combining with other chemicals is called valence. The valence of H is assumed as 1, and from this, the valence of other elements is determined. For instance: Since 2 atoms of H combine with one of O to form water, the valence of O is 2. The formula for carbon monoxide is CO , which indicates that C also has a valence of 2. However, carbon dioxide has the formula CO_2 , which indicates that under some conditions, C has a valence of 4. A

knowledge of valence is not essential for men engaged in water and sewage plant operation. If further information is desired, reference should be made to some standard chemistry text.

Acids, Bases and Salts

An acid is a compound that contains hydrogen which may be replaced by a metal. An excellent example is HCl , hydrochloric acid. The H can be replaced by Na, forming NaCl , or common salt. In the same way, sulfuric acid, H_2SO_4 , is changed to calcium sulfate or gypsum by replacing the H₂ with Ca.

A base is the oxide or hydroxide of a metal, as CaO (Calcium oxide or lime); NaOH , (caustic soda or sodium hydroxide); and Fe(OH)_3 or ferric hydroxide.

Reaction of acids with bases produces salts. For instance, NaOH plus HCl produces NaCl and water. Sulfuric acid and lime, $\text{H}_2\text{SO}_4 + \text{CaO}$, produce calcium sulphate and water, that is $\text{CaSO}_4 + \text{H}_2\text{O}$. Lime and carbonic acid, $\text{CaO} + \text{H}_2\text{CO}_3$, produce calcium carbonate and water, $\text{CaCO}_3 + \text{H}_2\text{O}$.

"Metal", in chemistry, is not restrictive, but includes potassium, sodium, calcium and magnesium as well as copper, lead, iron, silver and gold.

Beginnings & Endings

The force that holds the elements together in the form of compounds is electrochemical in nature. Elements having like electrical charges will not combine. Therefore a compound must be made up of electro-positive and electro-negative elements. Hydrogen and the metals are electro-positive; chlorine, oxygen, etc., are electro-negative. When elements are joined in a compound, the name of the compound is formed by the name of the electro-positive element followed by the name of the electro-negative element, with an ending which denotes the character of the combination. This may be "ide", as in sodium chloride or calcium oxide. When

(Continued on page 115)

HORTON ELEVATED WATER TANK

SURPASSES DEMAND

At Clearwater

In 1937, the Pinellas County Water System was put in operation to serve the string of islands from Belleair Beach to Pass-a-Grille, Florida. The system has been expanded many times since then but has never been able to keep up with the rapid population growth in the area.

At last, however, there is reason to believe the tide has turned. The addition to the system of a 200,000-gal. Horton* elevated tank at Clearwater has helped put the available water supply ahead of demand. The new tank, and a 500,000-gal. Horton tank installed in 1949, should keep the water supply ahead of population growth for some time. Consulting engineers on the job were Briley, Wild and Associates of Daytona Beach, Florida.

If your municipal water system is being outdistanced by population growth, write our nearest office for estimates or quotations on a Horton elevated tank to suit your needs.



*Trademark Registered in U. S. Patent Office

HORTON

WELDED STEEL
STORAGE TANKS

CHICAGO BRIDGE & IRON COMPANY

Plants in Birmingham, Chicago, Salt Lake City, and Greenville, Pa.

Atlanta 3	2123 Healey Bldg
Birmingham 1	1532 North Fiftieth St
Boston 10	1038-201 Devonshire St
Chicago 4	2115 McCormick Bldg
Cleveland 14	2221 Midland Bldg
Detroit 26	1536 Lafayette Bldg
Houston 2	2142 C & F Life Bldg

Los Angeles 17	1508 General Petroleum Bldg
New York 6	3316-165 Broadway Bldg
Philadelphia 3	1648-1700 Walnut St. Bldg
Pittsburgh 19	3246 Alcoa Bldg
San Francisco 4	1525-200 Bush St
Seattle 1	1339 Henry Bldg
Tulsa 3	1641 Hunt Bldg

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LIGHTING and TRAFFIC Control

More Fatal Traffic Accidents After Dark

A summary of the 1952 accident reports of 14 states for total and fatal traffic accidents reveals two important facts: (1) there are 36 percent less total accidents at night than during the day and (2) there are 18 percent more fatal accidents at night than during the day.

These reports divide traffic deaths during the hours of darkness between those on unlighted streets, and those on lighted ones. Over 3½ times more deaths occurred on the unlighted streets!

These state statistics, representing both urban and rural areas, clearly show that darkness is a major factor in traffic deaths. Darkness receives even greater—and more accurate—emphasis in figures for cities only, where most pedestrian accidents occur. From Street Lighting Magazine via Highway Research Abstracts.

"NO COLORED SIDEWALKS"

John Hubel

Although there is no ordinance on the books of Milwaukee, making it illegal to use color in the cement used in making sidewalks, one property owner has found that it must not be done. The manager for a clothing company located in the business section of downtown Milwaukee wanted to have the sidewalk in front of the store finished in maroon color so as to match the lobby of the store adjoining the sidewalk. Deputy public works commissioner Tanghe stated that, though no city ordinance was found to cover such a project, colored sidewalks would not be permitted. He said: "Do you want our downtown section looking like a carnival?" evidently thinking that other stores might get similar ideas but choose colors to suit themselves.

The store manager thought that color in sidewalks would beautify the section, so he went to the city attorney's office. He got nowhere, however, and was told that while no city ordinance can be found, in writing, colored sidewalks would be unlawful anyway. It's based on verbal decisions, the attorney stated, and warned the store manager that if the colored sidewalk was built,

the building owner would be subject to a fine of \$25 to \$100 for each 48 hours the colored sidewalk was left in sight.

The store manager was not sure that it was as bad as that and said he might try it, anyway.

Good Sense in Spacing Parking Meters

"In setting parking meters for parking", says Bernard W. Wich, Village Engineer, Herkimer, N. Y., "we are allowing 3 ft. between cars. This is due to the great width of many car doors and present supermarket shopping which necessitates women or men carrying large packages of groceries to cars, and holding the doors open while putting the packages in."

Parking and Parking Meters

Arkansas has authorized first and second class cities to install parking meters. California has provided for creation, organization and powers of parking districts within municipalities. Delaware authorizes municipalities to finance parking lots by issuance of general obligation bonds.

Georgia authorizes municipalities to issue revenue anticipation certificates to purchase parking meters. Iowa authorized use of parking meter funds for street widening, and issuance of general obligation bonds by cities and towns for parking lots. Massachusetts cities and towns may now acquire, operate and maintain off-street parking facilities and issue revenue bonds for financing. Minnesota authorized cities to provide off-street parking lots and meters. New Mexico makes similar provision for cities of over 40,000. Vermont cities are authorized to install parking meters. West Virginia has authorized all cities to provide parking facilities.—From the National Highway Users Conference.



• NIGHT SCENE, above, and day below, showing street in Kewanee, Ill., with standards of 26-ft. 6-in. mounting height and 6-ft. brackets. Wiring is overhead.

Courtesy American Concrete Corp.



...now one of the world's
brightest shopping districts



AFTER

Union Metal Monotube fluted and cold-rolled steel poles, with twin bracket arms parallel to the curb, mount the luminaires 28 ft. above the sidewalk.



BEFORE

MODERN LIGHTING has given Cincinnati's 4th and Race Street area 8 times more illumination than before. Formerly dark and uninviting with antiquated street lighting, business volume in this downtown district had deteriorated badly . . . fewer and fewer shoppers were coming to the area after dark. Now, twin 15,000 lumen units mounted on Monotube poles have given the district a bright future.

Merchants help pay the cost. Encouraged after a check on the value of modern lighting in various cities, 4th Street area merchants petitioned the city for fast action, also illumination in excess of that provided for in the city's General Fund. Council approved, with the merchants agreeing to pay the extra costs. The resulting stimulus to business proved again that *modern* street lighting is a dividend-paying investment and the modernization program is being extended to include the entire business district.

If you are planning lighting for any outdoor area, you'll want to get all the facts on modern Monotube poles. Write The Union Metal Manufacturing Co., Canton 5, Ohio.

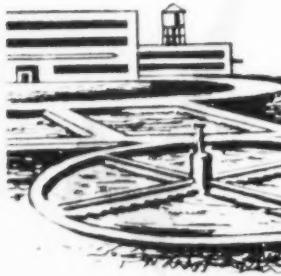
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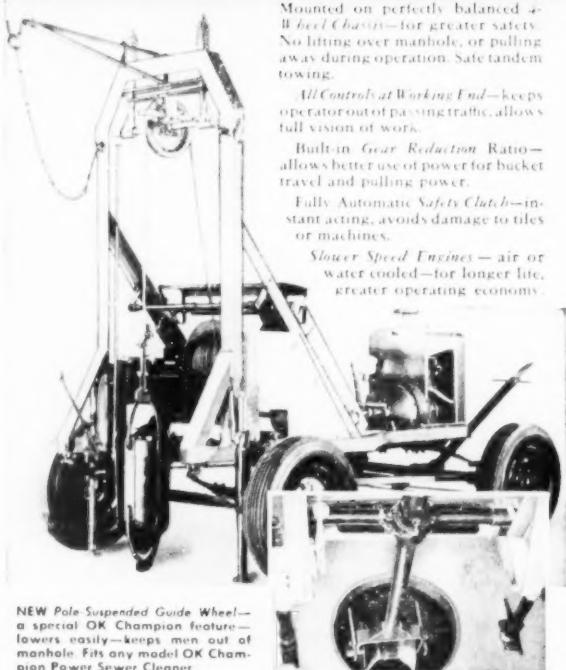
Mounted on perfectly balanced 4-wheel chassis—for greater safety. No lifting over manhole, or pulling away during operation. Safe tandem towing.

All Controls at Working End—keeps operator out of passing traffic, allows full vision of work.

Built-in Gear Reduction Ratio—allows better use of power for bucket travel and pulling power.

Fully Automatic Safety Clutch—instant acting, avoids damage to tiles or machines.

Slower Speed Engines—air or water cooled—for longer life, greater operating economy.



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APWA News

AMERICAN PUBLIC WORKS ASSOCIATION
1313 EAST 60th STREET, CHICAGO 37, ILLINOIS

Milton Offner Elected New APWA President

NEW ORLEANS, LA.—The results of the letter-ballot election were announced at the Annual Business Meeting of the Association held in New Orleans last month. Milton Offner, Secretary, Board of Public Works, Los Angeles, California was elected President to succeed Allan Rogers, Supt. of Public Works, Garden City, New York. Other new officers elected for the 1954 term were Kenneth King, Director of Public Works, Phoenix, Arizona who was elected to succeed Mr. Offner as Western Area Vice-President; Edward P. Decher, Secretary and Purchasing Agent, Joint Sewer Commission, Newark, New Jersey who was re-elected for another two-year term as Eastern Area Vice-President. Albert G. Wyler, City Engineer, New Orleans and Frederick Crane, Commissioner of Public Works, Buffalo, New York were each elected to serve two-year terms as directors-at-large. Charles W. Darling, Director of Public Service, Grand Rapids, Michigan was elected Treasurer to succeed Mr. Wyler.



Allan H. Rogers, Past President, Receives Flower at Caterpillar Tractor Exhibit

REGISTRATION AT NEW ORLEANS TOPS ALL PREVIOUS CONGRESS ATTENDANCE RECORDS

Val Peterson Describes Civil Defense Preparations Being Made Abroad and Points Out Factors Our Planners Must Consider

President

Milton Offner

Vice-Presidents

Ralph C. Graham Edward P. Decher
W. A. Coolidge Kenneth King

Past President

Allan H. Rogers

Directors

George G. Hyland Albert G. Wyler
Jean L. Vincenz Frederick Crane

Treasurer

Charles W. Darling

Executive Director

Donald F. Herrick

NEW ORLEANS, LA.—A new record of over 1100 registrations was set at the 1953 Public Works Congress and Equipment Show held in picturesque New Orleans. Members representing 38 states, the District of Columbia, Hawaii and Canada were present at the four-day convention. In the Municipal Auditorium they viewed the largest display of equipment used in public works projects ever seen in this city.

General sessions and the popular "What's Your Question?" panel discussions all enjoyed high attendance. At the opening session the principal speaker was Val Peterson, Federal Civil Defense Administrator. Speaking on "The Backbone of Civil Defense", Gov. Peterson told delegates that the organization to cope with such natural disasters as tornados and floods has been the good aspect of a job which deals with the most unpleasant phases of human events. He also described civil defense preparations being made abroad, and pointed out factors which must be considered by defense planners in this country.

Composting Discussed

In a symposium on composting as a method of garbage disposal, Dr. John R. Snell, Director of the Civil Engineering

(Continued on page 84)

NATIONWIDE CHAPTER ACTIVITIES REPORTED

New Chapters Organized in
Iowa and Wisconsin

Peter Burbach, City Engineer, West Allis, is deserving of a "well done" in getting the New Wisconsin Chapter on the road. The organizational meeting held in Madison, October 14 resulted in the election of the following slate of officers: President, Peter Burbach; Vice President, Carl Wahlstrom, Director of Public Works, LaCrosse; Secretary-Treasurer, John Thompson, City Engineer, Madison; Directors, Robert J. Poss, Director of Public Works, Marinette; H. B. Wildschut, Director of Public Service, Wauwatosa; W. E. Dick, City Engineer, Waukesha; Wayne G. Bryan, Director of Public Works, Neenah.

Iowa Chapter

Carl Fagerlind, Iowa State Chairman did a wonderful job in arranging the

(Continued on page 84)

F. J. Magnuson Wins Annual Nichols Achievement Award

NEW ORLEANS, LA.—The 1953 Charles Walter Nichols Award, annually presented in recognition of outstanding and meritorious achievement in the field of sanitation was awarded to Francis J. Magnuson, City Engineer of North Mankato, Minnesota, at the New Orleans Public Works Congress.

Mr. Magnuson received this high honor which includes an honorarium of \$500 and a scroll describing his achievement

(Continued on page 84)





Members of the new Iowa Chapter pictured at their inaugural meeting. First President of the new chapter is C. E. Allen, Street Commr. of Dubuque.

Chapter Activities Reports

(Continued from page 83)

"kick-off" meeting for the new Iowa Chapter which was held in Waterloo, September 24.

Cletus E. Allen, Street Commissioner of Dubuque was elected first President of the new chapter. Dean M. Larrabee, Director of Public Works was named Vice-President and Carl D. Smith, Assistant Health Officer of Cedar Rapids was elected Secretary-Treasurer. Others elected to serve on the Board of Directors were: Clifford Hamblin, City Engineer, Mason City; John Anderson, City Engineer, Marshalltown; Peter Roan, City Manager, Iowa City and Ray Hopkinson, Commissioner of Streets, Sioux City.

NY-NJ Metropolitan

Two hundred sixty-one members and guests attended the Fall Meeting of the New York-New Jersey Metropolitan Chapter at Essex Fells, New Jersey, Sept. 23rd. Paul Screvane, Director of Operations for the New York City Department of Sanitation was elected President to succeed E. Arthur Bell, Borough Engineer of Essex Fells. The new slate of officers also includes Andrew Eschenfelder, Borough Engineer, Glen Ridge, New Jersey (Vice Pres.); William Foster, Engineering Editor, The American City Magazine, New York City (Secretary); John J. Baffa, Consulting Engineer, New York City (Treasurer) and Harold Fredericks, Asst. Prin. Engr., Irvington, New Jersey and Francis Klaess, Supt. of Public Works, Rockville Centre, New York, who were elected to the Chapter Executive Committee.

Philadelphia

The Philadelphia Metropolitan Chapter held its annual Joint Meeting with the Philadelphia Section of the ASCE, October 13, at the Engineers Club in Philadelphia.

Utah

The Utah and Northern California Chapters recently reported the events which took place at two meetings in the Western Area. Roscoe Boden, County Surveyor of Salt Lake County was elected President of the year-old Utah Chapter to succeed Roy W. McLeese, City Engineer of Salt Lake City.

J. W. Allen, Manager of Distribution, Mountain Fuel Supply Company, Salt Lake City was elected First Vice-President and George W. Poulsen Jr., Consulting Engineer Salt Lake City was elected Second Vice-President at the recent meeting which was held in conjunction with the Annual Convention of the Utah Municipal League. Other officers elected to the Board for the 1953-54 term were: Win Templeton, Consulting Engineer, Salt Lake City; E. J. Allison, City Manager, Odgen and Earl Conder, City Engineer, Provo.

Michigan

The only chapter meeting held in the Central Area last month, other than those previously mentioned was held in Detroit. The Michigan Chapter met at Hucks Redford Inn, October 13th to hear a very interesting discussion of the transportation problem from the motor transport point of view. Verne M. Drew of the Fruehauf Trailer Company was the guest speaker.

Northern California

The Northern California Chapter held its last meeting September 18th at the Cort Hotel in Oakland. Mr. Rudolph Hers, Administrative Assistant to the Chief Right of Way Agent for the California Department of Public Works was the guest speaker at the luncheon meeting which attracted over forty members and guests. Further details of the local chapter meetings are reported in the Association's monthly Newsletter.

Magnuson

(Continued from page 83)

for his leadership in the restoration of municipal service in North Mankato following the devastating flood of April 1951, which inundated ninety percent of the city.

The Minnesota Chapter nominated Mr. Magnuson for the award because of the outstanding ingenuity which he displayed in improvising ways and means to restore the water supply and sewerage facilities under very difficult conditions.

The Association elected to honorary membership Charles A. Emerson, partner in the consulting engineering firm of Havens and Emerson of New York and

Cleveland. Mr. Emerson first joined the Association (which then functioned under a different name) in 1917. He formerly served as Chief Engineer for the Pennsylvania Department of Health and has long been recognized as a leader in the public health field.

Greeley Service Awards

Thirty six persons received the Samuel A. Greeley Service Award for completing thirty or more years of service with the same municipality. The award was established in 1930 by Mr. Greeley of the firm of Greeley and Hansen Consulting Engineers, Chicago, Illinois.

Film Of The Month

The Gardner-Denver Company in 1952 produced an excellent film entitled TIME SAVING AIR TOOLS. This is a 30 minute sound film produced in color. It is available free of charge on a loan basis from their office at Gardner and First Avenue, Quincy, Illinois. This film was actually prepared for company and distributor personnel but will also be very informative to public works officials as well. It presents various applications in maintenance and industrial work of paving breakers, spaders, tampers, clay diggers and sump pumps.

Registration Tops All

(Continued from page 83)

Department, Michigan State College, predicted that composting will be the next major advance in the field of sanitary engineering; and that basic research, presently being conducted, will give composting processes a place among man's many useful sciences. Other aspects of composting, including operational problems and economics, also were discussed at this session. Carl Schneider, consulting engineer, New Orleans, served as moderator.

Panels Cover Many Topics

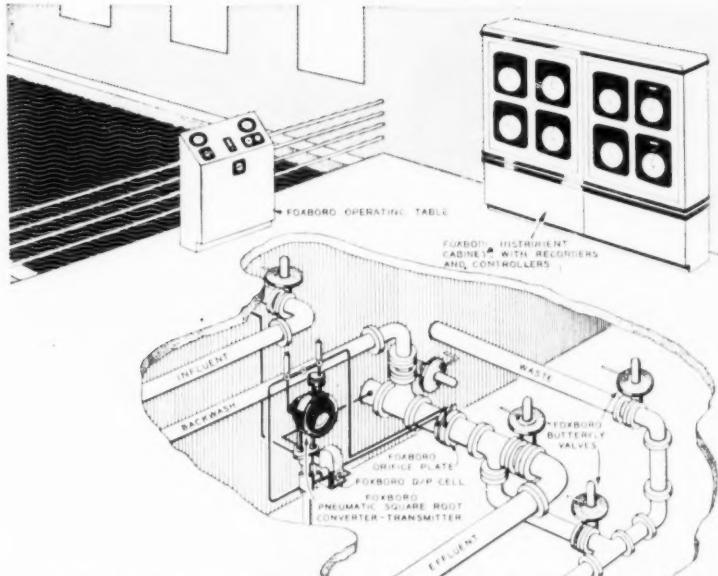
Two sessions were devoted to "What's Your Question?" topics, which enabled public works officials to attend their choice of six panel tables, each staffed by a panel of experts. Subjects covered included street design and construction, personnel administration, refuse disposal, public works financing, public relations, subdivision development, street maintenance, refuse collection, parking and traffic control, drainage, equipment management and street sanitation.

The second general session featured Intergovernmental Relations in Public Works. Here the problems of cooperation and shared responsibilities of cities, counties and states in the fields of streets and highways, water supply and distribution and sewage treatment were presented in a symposium moderated by William G. Willis, Executive Director, Institute of Local Government, Univer-

(Continued on page 86)

New! Exclusive!

"Fingertip" Control for
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A modern Foxboro Rapid Sand Filter Control System. When Selector Switch on operating table is turned to desired position Foxboro Controllers automatically take over operational control of valves.

The New Foxboro Rapid Sand Filter Control System combines maximum operating convenience with a minimum of maintenance. Its all-pneumatic transmission and control eliminates drums, cables, and pulleys... makes possible remote operation of valves without high pressure piping to the control panel.

In normal operation, the operator needs only to turn the selector switch to one of its four positions to control: filtering; influent-off; backwash-

ing; effluent-to-waste. Also, all adjustments of filtering and backwashing rates are easily made at the operating table.

All connections are made with $1/4$ " copper tubing. Hence, installations with remote setting of flow rates... and with supplementary remote indication... are simple and economical.

Write for detailed Bulletin 466. The Foxboro Company, 2611 Norfolk St., Foxboro, Mass., U.S.A. Branch offices in principal cities.

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Annual Dinner Meeting of Board of Directors and Past Presidents of the American Public Works Association, New Orleans, La., October 26, 1953



A Portion of the Record Breaking Display of Equipment in the Municipal Auditorium, New Orleans, 59th Annual Public Works Congress and Equipment Show

city of Pittsburgh. Other topics of the general sessions were incinerator design and operation, street uses and a symposium on performance budgeting for public works.

Exhibitors tell of interest

W. M. Holland, Ass't Sales Mgr., Industrial Power Division of International Harvester Co., told PUBLIC WORKS at the Congress "the members of the American Public Works Association are very important to companies like International Harvester who manufacture both motor trucks and industrial power equipment."

"Our primary interest is to be sure we are designing and building equipment that will lower the cost and permit more efficient operation of these various public works."

C. R. Schroeder, Sales Mgr., Drott Mfg. Co., stated, "As the manufacturer of the Drott Bull Clam Shovel we are particularly interested in such functions as the American Public Works Association, principally because our equipment is specifically designed to handle municipal garbage and refuse disposal by the sanitary fill method."

European Comments on Refuse Disposal

ONE speaker at the Fifth International Public Cleansing Conference said that the U. S. Sanitary landfill method could not be compared with the British methods of controlled tipping. With the latter method, the right proportions of air and moisture completely transformed the tip within six months into good-smelling earth; while the American landfill was so compacted that it took ten to a hundred times as long to convert organic matter. A Vienna engineer said that in his city there was no dust or spillage in conveying refuse containers to the collecting vehicles. Only standard containers with tight-fitting lids were used. They were purchased by the city and issued free of charge and maintained free of charge. They were 180,000 in use, some of them 30 years old.

One suggestion was: Have each collecting vehicle start out with one clean, empty receptacle, deposit this at the first house visited, carrying its filled receptacle back to the vehicle, where it would be cleaned by a power-driven brush, and delivered at the next house.

Amsterdam's Director of Public Cleansing said composting of refuse, as practiced in the Hague, would not be economically attractive as a substitute for incineration as practiced in Dordrecht, Rotterdam and Amsterdam. At the Hague, the refuse is hauled by rail to Wijster, where it is dumped between high viaducts, forming heaps 15 to 18 ft. high, where it is left to ferment for 5 or 6 months, being turned over once. The cost of this, including transport, is 10 s 9 d per ton, for which there is no offsetting revenue; all return from sales of the refuse for fertilizer going to the company which takes the fermented refuse and prepares it for use as fertilizer. In the other cities named, where disposal is by incineration, the costs are 9s, 10 s 2 d and 6 s 10 d. The reconstruction cost of the Hague installation would greatly exceed that of the three incinerators.

On the subject of street cleaning, the Cleansing and Transport Manager of Stoke-on-Trent, England, said one good rain did more good than a thousand men in a week. He suggested "push-button" street flushing. There would be jets fixed permanently in the middle of the street, the gutters and the sidewalks, so arranged that, when started, all of these would be operated automatically in pre-arranged sequence.

• • •

Elevated Tank Increases Water Pressure 15 Psi.

WATER pressures in the distribution system of Taylorville, Ill., have been increased by an average of 15 psi by the installation of an elevated tank. Pressures now range from 50 to 60 lbs. The 32.5 miles of lines in the distribution system serve 2865 domestic, 175 commercial and 10 industrial users. Consumption averages 0.8 mgd, with a high of 1.3 mgd.

The elevated tank, which was constructed by Chicago Bridge & Iron Co., has a capacity of 500,000 gals. It is 111 ft. from the ground to the bottom and provides a range in head of 25 ft. In addition to the softening and filtration plant, which

THIRTY-SEVEN YEARS and YOU

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HIRTY-SEVEN YEARS is a long time. Historians consider it a generation. Many things happen in that length of time to change our lives. The passing years add experience that guides our forward steps.

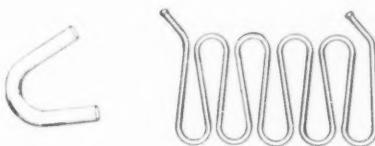
Since the start of our business, thirty-seven years ago, many changes have taken place at Wolverine. Each has been a step forward—the natural result of experience that has been constantly furnishing the inspiration for us to keep looking ahead in search of better ways of doing things, in order that we may bring you the best tube products that human effort, skill, and modern equipment can provide.

Our efforts are confined not only to the manufacture of such standard products as refrigeration, automotive, water and wet heat tubing, but they are also devoted to finding ways that will aid you in handling the product most efficiently and profitably.

Wolverine also introduced to the industry the individually cartoned coils, which proved a boon to the merchandising and handling of the tube.

The public support we are giving the wholesalers is receiving wide acclaim; and the slogan "Buy From Your Wholesaler" is making its influence felt in all parts of the country. Such merchandising helps as posters, stickers, and other display material that Wolverine has distributed throughout the trade has done much to advance the wholesalers' cause.

Now is a good opportunity to express our appreciation for the whole-hearted cooperation being evidenced among wholesalers. And we take this occasion to say "Thank you." We should like to say this to you individually, as we pledge ourselves to continued cooperation in your behalf.



WOLVERINE TUBE DIVISION
of CALUMET & HECLA, INC.

Manufacturers of Quality-Controlled Tubing
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EXPORT DEPT., 13 E. 40th ST., NEW YORK 16, N. Y.

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is of 2 mgd capacity, water plant equipment includes six electrically driven pumps and a 2100-gpm gas engine driven standby. The operation of all of the pumping equipment is controlled automatically.

• • •

Removing Curb Like Pulling Teeth

On a major road construction project in Ohio, it was necessary to remove a large amount of sawed sandstone curb, which had a salvage value of about \$2.70 per foot. A Gradall was the key equipment used in solving the problem. Equipped



with a 15-inch trenching bucket, the Gradall first used its bucket to loosen the dirt along the curb row. Then a tong grab, devised by the Horvitz Co., was attached to the bucket and the individual sections of curb were lifted out. Operation was at the rate of about 1,000 ft. per day.



Presented in cooperation with the American Public Works Association
and through the courtesy of the
Washington Office of the American Municipal Association.

Highways, Water and Sewerage Jobs Lead Public Construction Gains

According to the U. S. Department of Commerce, expenditures for new public construction continued at record levels in August, totaling slightly higher than \$1.1 billion.

During the first eight months of 1953 total public works outlays for new construction were 6% above 1952 levels. Road construction expenditures during the first 8 months

of 1953 totaled an all-time high of \$1.9 billion. Educational construction was up 3.4%; highway construction up 9.6%; sewer and water construction up 7%; conservation and development construction up 2%. Public works construction in the field of hospitals was down 19.8% and miscellaneous public service enterprises down .8%.

The Materials Picture in the Public Works Field

In answer to queries regarding the amount of aluminum which will be available to civilian users in the 4th quarter of 1953, the Office of Defense Mobilization said in mid-September: "It is estimated that aluminum available for civilian users should be between two and three percent higher in the 4th quarter, than in the preceding quarter. The total of both primary and secondary aluminum, however, can range to six percent on the basis of increased amounts of aluminum expected to be imported from foreign sources during the 4th quarter."

The National Production Authority's Iron and Steel Division reports

that only minor difficulties have been encountered by steel consumers since the decontrol action taken some time ago.

Pending completion of government studies now underway NPA officials announced the postponement of any change in the present system of nickel control. The study indicates that there is not enough nickel for all civilian use after Defense, Atomic Energy and military requirements were met. Until such time as nickel is available in sufficient quantities to meet the demand, over and above Federal government requirements, it is not likely that controls will be lifted.

Commerce Dept. May Lift Scrap Export Ban

Public works officials welcomed the news from Washington that Commerce Secretary Weeks is considering lifting the present ban on iron and steel scrap exports. With the scrap market falling away to post-war lows and with steel mills high on scrap inventories, those cities which depend on scrap sales for public works income have been feeling the pinch. The ban on exports has helped create the glutted market conditions which now exist.

If Secretary Weeks agrees to remove the restrictions on exporting iron and steel scrap, the return of a competitive market, with correspondingly higher prices for scrap sellers is expected. This would be welcome news to public works officials who have watched scrap stocks build up in their own backyard in recent weeks, or who have been forced to sell scrap at a fraction of the prices they were getting as recently as 8 or 9 months ago.

Our Whites do more work!



REPORT from the construction industry from coast to coast: "Our Whites do more work!"

Functional design of this modern truck permits more payload . . . driving ease . . . outstanding maneuverability . . . substantial maintenance savings.

In every way, it proves its performance every day, in hardest kind of service. On the job for Southwest Paving Company . . . or in your business . . . it's today's way to do more work . . . in less time . . . at lower cost.

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

White 3000 Production Line Saves Time

One of a fleet of White Model 3022 PLT's owned by Southwest Paving Co., Sun Valley, Calif., operators of some of the world's largest asphalt plants. This unit hauls 9 1/2 tons of asphalt . . . speeds paving projects for this well-known paving contractor.



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Building and Stabilizing an Access Road

G. E. MARTIN,
Highway Consultant,

LIKE most cities of its size, Hartford, Conn., has been plagued with the problem of adequate streets and highways to care for the ever-increasing traffic load. One job was to provide a new traffic artery for the portion of alternate US 5 within the city limits. This route connects Springfield, Mass., and Hartford along the west bank of the Con-



● ACCESS road provides better route to municipal dumping area.

nnecticut River. Fortunately there was a practically uninhabited section, called North Meadows, between the river dike and the New Haven railroad for almost the entire length of the desired improvement. The state highway department located and constructed, in 1950, a four-lane divided, cement concrete, limited access highway from the center of the city to a connection with the existing alternate US 5 near the city limits. This new highway is slightly over one and one half miles long and is fenced its entire length so that access to the highway is possible at only a few designated points.

While this section is only sparsely populated there is a considerable

amount of commercial traffic using the few highways in the area. All material moving to the municipal dumping ground along the river must pass through the North Meadows.

To provide access to the new highway the state highway department built a 30-foot wide gravel road parallel to and on each side of the new highway and passing under the new expressway at each end. Thus, a loop of 30-foot highway, 3.4 miles long was constructed during the winter of 1949-50.

Approximately 65,000 cubic yards of earth was obtained from borrow pits and placed and consolidated to form a solid sub-grade. A gravel road, 12 inches thick was built in two courses, on the prepared sub-grade. Work was done in accordance with the specifications of the Connecticut State Highway Department and the gravel met the gradation requirements given in Table 1.

Table 1.—Road Building Gravel

Sieve Size	Percent Passing
2 ¹ / ₂ -inch	100
3 ¹ / ₂ -inch	60-75
1 ¹ / ₂ -inch	25-40
No. 40	5-20
No. 100	0-5

The material passing the No. 100 sieve was required to have no plasticity when tested by the standard AASHO method.

The gravel was processed by first making stock piles of three different sizes. Material passing 2¹/₂ inches and retained on the 3¹/₂-inch sieve; material passing 3¹/₂-inch and retained on the 1¹/₂-inch sieve; and material passing the 1¹/₂-inch sieve. Gravel from each of these three stock piles was then combined to meet the required gradation. All of the gravel was washed and a portion was crushed. In all, 29,100 cubic yards of gravel were used at a cost of \$2.30 per cubic yard.



● SEAMAN mixer on the job; it was rented for 6 cents per sq. yd.

The gravel access road was placed in service in the spring of 1950. It was solid enough but became very rough and dusty. It was difficult to maintain under the comparatively heavy traffic using it. Because of this, the city decided to stabilize the top six inches by mixing tar binder with the gravel.

Two Seamen Pulvimixers were used for preparing the gravel and mixing the tar with the gravel. These were rented at a cost of 6 cents per square yard of pavement. One pulvimer was pulled by a tractor and used to loosen the gravel. Three or four passes were generally needed adequately to prepare the gravel for mixing with the tar binder.

The other pulvimer was self-propelled and provided with spray bars for coating the gravel with the tar. The original plan was to use one and three quarter gallons of road tar RT-4 per square yard, for the six inch depth. After a trial section it was decided that this was too much, and one and one half gallons per square yard were used for the remainder of the work.

In doing the mixing a tank load



● STABILIZATION required total of 120,000 gallons of RT-4 tar.



YOU get more for your money than just a motor grader!

WHEN you buy a piece of Cat* equipment, you think of a lot of other things besides tough steel and yellow paint. Things you can't see or feel or touch, but that will help you save *more money this year—and year after year!*

You *know*, for instance, that you can count on steady production because your equipment will keep you on schedule. Its stamina, *plus* on-the-spot service from your Caterpillar Dealer, cuts down time to the minimum.

You *know* the taxpayers will back your choice of the big yellow machines because of their reputation for economy.

You *know* there are no "orphans" in the line. You can work Caterpillar machines profitably for years and *always* get parts for them—at the standard low price.

You *know* that day after day, week after week, month

after month, they will do *more* work with *less* down time at *lower* cost than any competitive units.

And, finally, you *know* that when you're ready to trade in a Cat machine you'll get more money for it—the *top* resale value in the field.

Getting ready to buy earthmoving units? Fine. Look them all over. But look at your last cost first. Remember what you *know* about Caterpillar!

Caterpillar Tractor Co., Peoria, Illinois.

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DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

of tar was brought along side the pulvimer and a hose run from the tank to the pulvimer. As the two machines moved along the road the tar was forced through the spray bar in the pulvimer, coating the gravel as it was agitated by the revolving tines of the pulvimer.

Three or four extra passes by the pulvimer were necessary in order to obtain a thorough coating of the gravel with the tar. The large gravel particles were never entirely coated but since they were surrounded by tar coated sand that caused no difficulty. Some of the

mixing was done even during a rain with successful results.

The tar coated gravel was consolidated by means of a rubber tired roller. Eight or ten passes were necessary to obtain adequate compaction.

At this point a better job would have been obtained if a blade grader had been used to smooth the surface. However it looked smooth, so the blade was not used. As a result the finished road was slightly rough and not as good a riding job as should have been achieved.

After rolling, the road was given

a tack coat of approximately one quarter gallon of road tar RT-4 per square yard, covered with about twenty pounds of sand per square yard. The sand was swept and rolled in place. The road tar used for the entire job cost \$0.1159 per gallon and the sand \$1.13 per ton.

This work was done in the middle of the summer and the road was subjected to traffic until the next year. At that time the highway was smoothed and sealed with asphalt emulsion RS-1 at the rate of one-third gallon per square yard. Half-inch stone was used for cover at the rate of twenty-five pounds per square yard. The emulsion cost \$0.1240 per gallon and the stone \$1.50 per ton.

This work was done under the direction of R. W. Thompson, former Director of Public Works, and Charles W. Cooke, present Director of Public Works, City of Hartford.

• • •
**Air Placed Concrete Solves
Dam Repair Problem**

The problem of repairing damage due to spalling on the back face of a concrete dam at Morgantown, North Carolina was recently solved by Duke Power Company engineers, using the air placement method of applying concrete. The resurfacing was accomplished by gunning concrete onto crumbled areas of the dam with a Model 1250-S Bondactor.



Loose, crumbling concrete was first removed. Then the surface was sandblasted with the same equipment later used to place the sand-cement mix. An absolute bond to old concrete was formed, so dense, that further water seepage, freezing, and crumbling were halted.

A 105 CFM air compressor powered the Bondactor equipment. A Bondactor air operated water pump supplied water to the nozzle from an open barrel.

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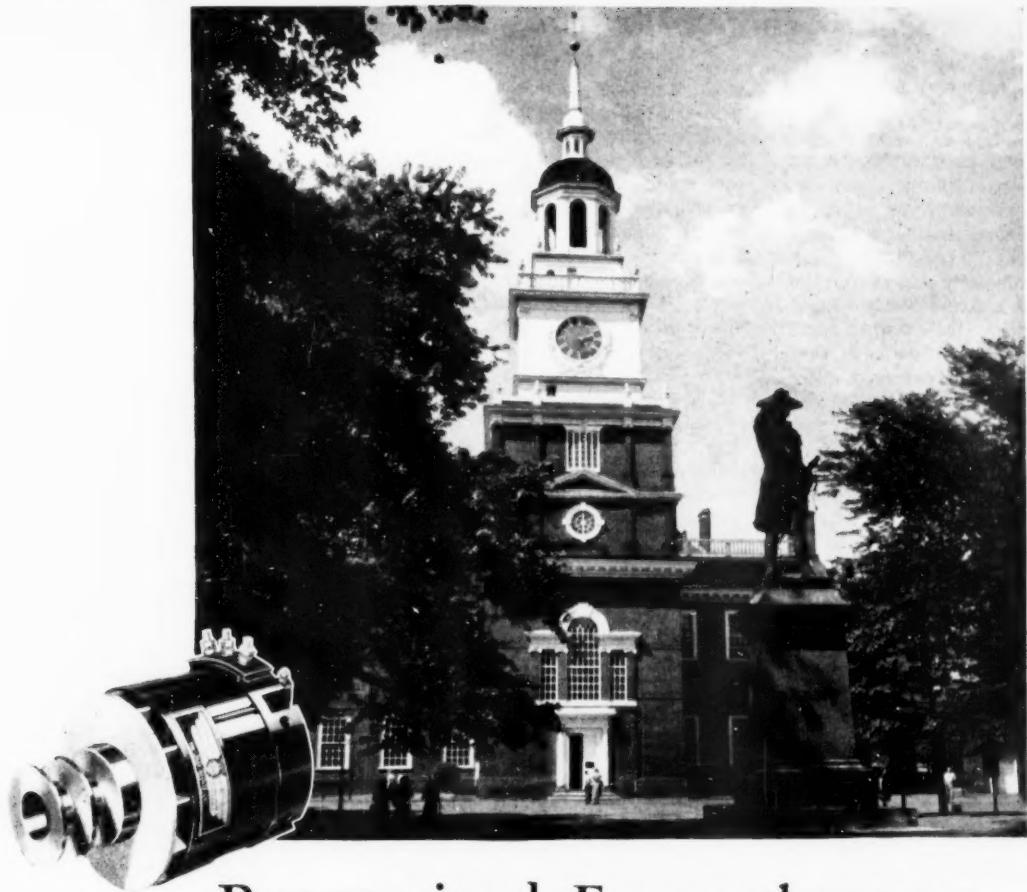
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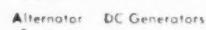


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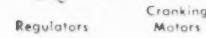
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Disposal of Tannery Wastes

WORTHEN H. TAYLOR

Associate Sanitary Engineer
Massachusetts Department of Health

THE Hartnett Tanning Company, Inc., in the town of Ayer, produces typical tannery wastes which were formerly discharged to Grove Pond. The municipal water supply for the town of Ayer and the water supply for Camp Devens are obtained from wells located on the bank of that pond. Nuisance conditions frequently prevailed in Grove Pond due to the limited dilution available for the tannery waste. The analyses of samples collected from the two water supplies showed a marked increase in chlorides, hardness, nitrates and organic matter due to the discharge of wastes to the pond. With the public water supply in danger it was decided that the wastes of the Hartnett Tanning Company no longer could be discharged to Grove Pond.

Experiments conducted at the Lawrence Experiment Station of the Department of Public Health showed that the tannery wastes could not be

treated by known methods to provide an effluent which properly could be discharged to Grove Pond. It did not appear probable that easements could be attained for the construction of an effluent line to a point of disposal below the pond. The experiments did show that the settled tannery wastes could be treated on standard rate trickling filters when properly diluted with the settled sanitary sewage of the town of Ayer.

The Ayer sewage treatment plant consisted of an Imhoff tank, dosing tank, standard rate trickling filters with fixed nozzles, a secondary settling tank and open sludge-drying beds. The trickling filters were of adequate size to treat both domestic sewage and industrial wastes. Additional settling and sludge-drying facilities were required if the plant was to handle both domestic sewage and wastes from the tannery. The town constructed a force main from the tannery to its municipal treatment plant. In addition, it constructed two

primary settling tanks with mechanical sludge and scum collectors to receive the industrial wastes. An additional secondary settling tank and open sludge-drying beds were also constructed. As tannery wastes are not discharged at a uniform rate, a holding tank was provided in order that a proper ratio of industrial to sanitary wastes could be maintained on the trickling filter at all times. The effluent of the primary settling tanks is mixed with the effluent from the tank receiving domestic sewage. The combined effluents are discharged intermittently onto the trickling filter. Sludge from the settling tanks goes to the sludge-drying beds. The Legislation authorizing the town of Ayer to borrow money over and above its debt limit for the expansion of its municipal sewerage system and treatment works provided that the Hartnett Tanning Company repay the town for such additional expenditure together with interest over a ten-year period. Due to unforeseen delays the cost of construction increased and it was necessary to return to the Legislature for authorization to borrow additional moneys. The tannery agreed to pay a considerable portion of the additional cost, whereby the company will reimburse the town for maintenance and operation of the treatment works over and beyond the cost if domestic sewage only were treated at the plant.

Industrial wastes were first pumped to the new treatment works on April 17, 1953. The primary settling tank was placed in full operation immediately. In order to prevent shock loading of the trickling filter a considerable portion of the settled industrial waste was bypassed but the amount treated has been increased gradually to a point where all wastes are now treated.

The plant has not been in operation a sufficiently long period of time to draw any final conclusions. The results of its operation are being watched with care. —Sanitalk.

• • •

Charging for Commercial Waste Collection

KENNETH H. WEISS

City Clerk, West Bend
In The (Wisconsin) Municipality

UR city found that its costs of collecting refuse and garbage were increasing each year out of proportion to wage and population increases. After a study of the man-

Big Sewer Tunnel Dug by Coal Mining Machine

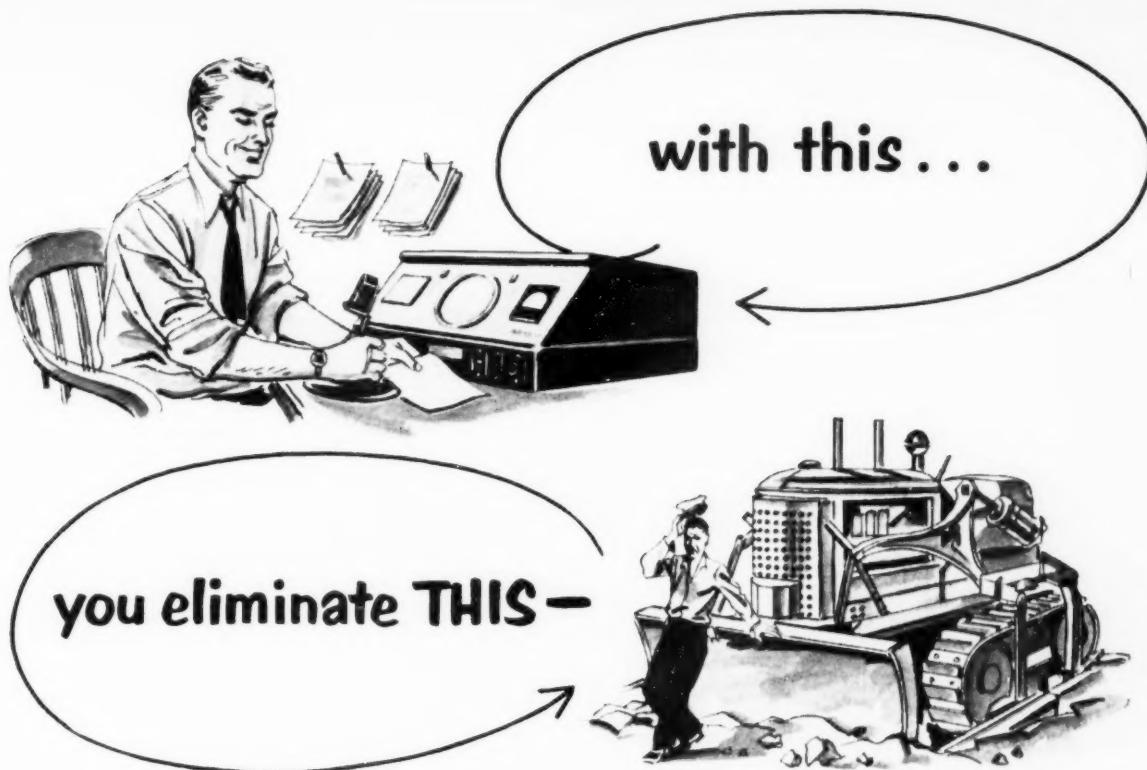
To provide storm sewer capacity for Euclid, O., a 12-ft. storm sewer is under construction some 30 ft. underground. Standard methods of construction were used first, with drilling and blasting. Residents in the area through which the sewer passed were vociferous in their complaints, so the work was halted. The National Construction Co. of Cleveland, contractors for the work, then purchased a Joy continuous coal mining machine and put it to work. It is equipped with cutting teeth at the front, crawler treads and a belt conveyor. It cuts through the medium-hard shale at the rate of 20 ft. or more every 8 hours. Complaints have ceased.

This mining machine is about 25 ft. long and 7 ft. wide. It is electrically driven with seven 440-volt Reliance motors. Its use for sewer tunneling appears to open a new field. The areas under street surfaces are already so seriously crowded with utility structures that it is be-

coming increasingly necessary to construct new large utilities deeper down, below the depths at which they will affect existing pipes and conduits.



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ner in which collections were made, we discovered that much of the increased cost was due to the manner in which many business houses set out their refuse for pickup. Many business houses made no effort to cut down the bulk by nesting or flattening cartons and boxes. Many loads were hauled to the incinerator plant that did not weigh over 200 or 300 pounds, unless our crew took the time to flatten or nest the boxes and cartons.

After studying the matter the council decided to make a charge for the collection of refuse and

garbage from business houses as this waste is considered part of a business operation. We do not haul wastes from industries so other business houses were placed in the same category.

Any business house that requests garbage collection is required to purchase a coupon book of 25 coupons at a cost of \$6.25. Each coupon is good for the collection of one 20 gallon can of wrapped garbage or combustible material. Business houses that request rubbish collection must secure rubbish coupon books of 25 coupons each at

a cost of \$12.50 per book. Each such coupon is good for the collection of 1/3 cubic yard of rubbish.

We estimate that our present charge takes care of 90% of the actual cost. When the business men first objected to the charge, the council agreed to give it a 60-day trial, and if the charge could be reduced or if the business men found a better solution to the problem, it would be changed or adjusted. The trial period is over and no further objections have been made by the business men, so we assume that everyone is quite satisfied.

• • •

How a Central Equipment Agency Can Perform

H. R. RICHARDSON

City Manager, Ashland
In the (Wisconsin) Municipality

EARLY in 1951, the city of Ashland set up an organization called the equipment agency. The need for this installation was for reasons which are common to all small cities. Such cities know the impact on the budget when it becomes necessary to purchase a new piece of equipment. If the piece of equipment is a costly one, such as a grader or heavy truck, the financial strain is apt to be excessive. What often happens is that the purchase is not made, with the result that the municipality operates a dilapidated piece of equipment or else goes without.

There were other reasons for the installation of the equipment agency. It was felt that if all equipment was brought under one responsible authority, the person in charge would then make sure that it was properly maintained at all times. By centralizing control of equipment it was believed that the equipment would be more efficiently used and would be assigned on a basis of need.

The city of Ashland now has equipment which is in fine shape, properly maintained and repaired, and which is used, we believe, in the most effective manner at all times. Replacement of equipment is automatic and puts no strain on the general fund. We purchased 2 new trucks in 1952 and also in 1953. This is no small item for a city of our size. Old trucks were turned in for the new ones and the balance of payments was supplied by the money in depreciation accounts. It is a pleasant feeling for a city official to decide to get rid of an old inefficient vehicle and know that he

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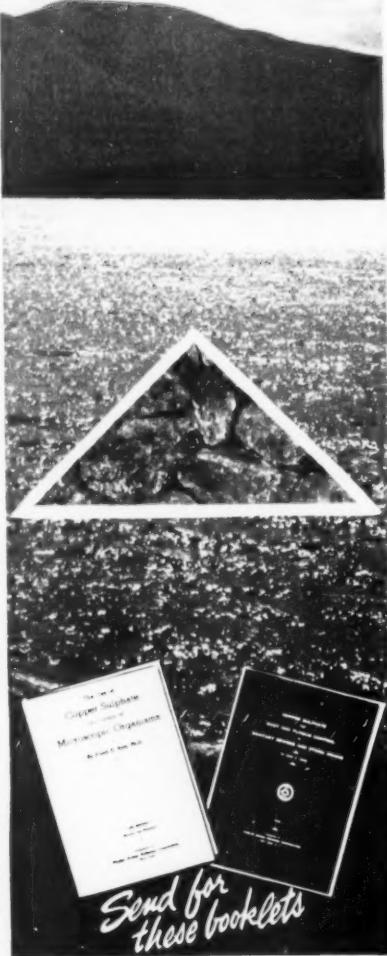
Roots and fungus growths in sewage systems are controlled with copper sulphate when added to sewage water without affecting surface trees.

Booklets covering the subject of control of microscopic organisms and root and fungus control will be sent upon request.



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will have no trouble in financing a new replacement.

When it was decided to install our equipment agency, a firm of public accountants was engaged to set up the proper accounts and procedures. An inventory was taken of all public works equipment. Rental rates were established for each item used by the department. These items not only include trucks, graders and other mobile equipment but also chainsaws, pneumatic drills, curb and gutter forms and many other small items. Daily and weekly reports were required to provide the necessary information and our foremen were impressed with the need for accurate reporting.

The cost of additional equipment cannot be taken from the equipment agency fund. This cost must be met by the city council through appropriation or otherwise. Until this year we had no air compressor having always rented one when it was needed. An amount was budgeted to provide for the purchase of this piece of equipment. A new compressor was purchased, assigned a number and a rental rate of \$1.50 per hour, and is now busy building up a depreciation fund to replace itself when it is worn out.

Several problems arise in an equipment agency such as this. Our rental rates during the first year of operation were based on the state of Wisconsin rental rates. These turned out to be too high for us, so many of the hourly rates have been reduced.

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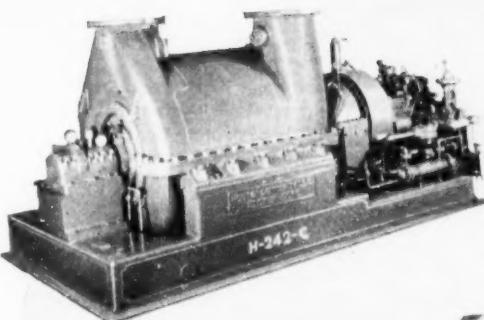
Sump Under Garbage Body Prevents Dripping

A sump tank has been attached to the bottom of the hopper of a packer-type garbage truck, according to a note from Robert Lovelace, City Manager of Delray Beach, Fla. This sump tank is made of 8-inch pipe and is equipped with a valve, which is opened when the truck arrives at the landfill site. Its use prevents wetting of the streets with seepage from the garbage.

• • •

Chlorine Residuals in New Orleans

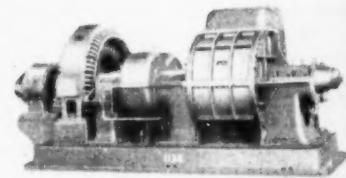
Chloramine treatment is used in New Orleans, La., and according to the report of the Sewerage & Water Board for 1952, a chlorine residual is maintained at the plant of 0.7 ppm, while the average residual in the distribution system is 0.53 ppm.



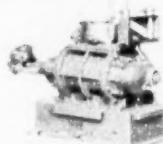
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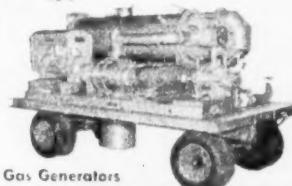
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5 cfm to 50,000 cfm.



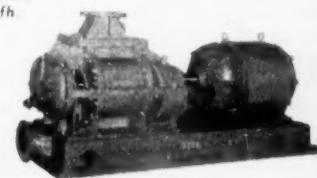
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Texas Water Works Operator's Training

COURSES for the training of water works operators have been revised by the Engineering Extension Service of the Texas A & M College. The Chief Instructor is L. N. Ronhovde and J. G. Lynch and Leon R. Holbert are Field Instructors. Additional instructors will be added as needed. This program constitutes an improvement to the past excellent courses available to Texas operators. The program follows:

Unit I. Basic Water Works Operation—20 Hours: *For whom intended:* All employees of public water supply systems who have not as yet obtained a "C" certificate. *Course Content:* This course includes the basic general information regarding importance of water to a community, the physical characteristics of water, the protection of water supplies, the protection of water storage, characteristics and care of pumps, and the sanitary protection of the water system.

Unit II. Advanced General Water Works Operation—20 Hours: *For whom intended:* Any employee of a public water supply system who

already has a "C" certificate. *Course Content:* This course includes more technical, specific and detailed information on the same topics that are in the "Basic" course. It does not go into the details of "Production" or "Distribution". Other topics to be included are: bacteriology of water, chemical impurities of water, chlorination, and routine analysis.

Unit III. Well Production—20 Hours: *For whom intended:* Any employee of a public water supply system who already has a "C" certificate and has completed Units I and II above, or can show evidence that he possesses the equivalent of the same fundamental information. *Course Content:* This course deals with operational problems, care, operation and maintenance of well equipment, general information of the principles involved in location, specifications, drilling, completing and testing wells and the importance of securing engineering advice.

Unit IV. Surface Production—20 Hours: *For whom intended:* Any employee of a public supply system who already has a "C" certificate and has completed Units I and II

above, or can show evidence that he possesses the equivalent of the same fundamental information. *Course Content:* This course includes detailed and specific information on surface supply, pumps and motors, coagulation, sedimentation, filter construction, loss of head gauges, rate controllers, filter operation, chlorination, routine tests, records.

Unit V. Water Distribution—20 Hours: *For whom intended:* Any employee of a public water distribution system who already has a "C" certificate and has completed Units I and II above, or can show evidence that he possesses the equivalent of the same fundamental information. *Course Content:* This course includes operation and maintenance of a distribution system, construction, principles and materials of extensions and customer service lines, elevated storage, sanitation, metering, maps, records and distribution problems.

The above courses are offered by the Texas Engineering Extension Service. A class will be organized in any district or area for any of the courses for which there is a minimum of twelve eligible men to enroll. The number and frequency of schools will depend on the availability of instructors.



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BOOKS IN BRIEF

TOXIC MATERIALS
IN WATER

This is a booklet published by the Environmental Health Center, Cincinnati, O., the "Qualitative and Quantitative Determination of Toxic Materials in Water" by C. C. Ruchhoff, W. Allen Moore and F. M. Middleton. Mimeographed.

INDUSTRIAL WATER
& WASTE ANALYSES

This is a symposium on the continuous analysis of industrial water and industrial waste water. Included are discussions of chlorine residuals, color, turbidity, hardness, silica, pH, electrical conductivity, etc. 64 pages; \$1.50. ASTM, 1916 Race St., Philadelphia 3, Pa.

RESEARCH
REVIEW

This "Review of ASTM Research" summarizes the work of many technical committees. 22 pages, no charge. ASTM, 1916 Race St. Philadelphia 3, Pa.

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This book explains in detail the steps necessary in the design of both timber and steel roof trusses. Illustrative examples show precisely what steps in design are necessary and how to carry them out. Coefficients have been worked out for determining stress in simple structures. This is the second edition and it includes recent changes in specification requirements. 272 pages; 135 ills. By Harry Parker. John Wiley & Sons, Inc., New York. \$4.

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of engineering cannot be covered in one text, by the method of fairly detailed studies of particular applications, the principles involved are illustrated and explained. The book is a technical one, and as such it is not easy to review in any detail. There is a foreword by E. Freyssinet; the author is Y. Guyon. Editing is by W. M. Johns from the translations of A. J. Harris, J. D. Harris and T. O. Lazarides. Printed in England, this text is handled in the United States by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 543 pages; \$12.

CHANNELIZATION AND PAVEMENT WIDTHS

Two papers are included in this Bulletin 72 of the Highway Research Board. The first describes unique methods for the movement of traffic through high-volume intersections at grade. The second gives in detail a practical method for determining required pavement widths by the use of scaled models of typical motor-vehicle types. Copies of this 53-page booklet may be obtained from the Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C., at a cost of 75 cents each.

AIR-ENTRAINED CONCRETE

This 26 page booklet contains two papers on the subject. The first describes a method of measuring the air voids of different mixes, percentages of air and admixtures and gives the results obtained. Number of voids per cubic yard sounds like the Federal budget—5 billion to 130 billion. The second paper gives the service record of 14 concrete test roads in five northeastern states built from 1939 to 1942. Little or no sealing on the air-entrained sections is reported. Bulletin 70 may be obtained from the Highway Research Board, 2101 Constitution Ave., Washington, D. C. at a cost of 45 cents.

PUBLIC GROUNDS MAINTENANCE HANDBOOK

This handbook is the result of several years of study and experience in the maintenance of large public grounds such as those which surround Tennessee Valley Authority dams and powerhouses. It presents, in considerable detail, technical information on lawn and grass culture and maintenance, tree and shrub maintenance, weed control,

insect and disease control, erosion control, road and parking area maintenance, picnic area maintenance and material and building specifications. \$5.00 from Tennessee Valley Authority, Old Post Office Building, Knoxville, Tenn.

DISTRIBUTION OF LOAD STRESSES IN HIGHWAY BRIDGES

This 85-page booklet contains six separate papers on different phases of the load distribution problem. The article analyses full scale stress measurements and tests of models are included in the series. It is a separate treatment of several parts of the problem rather than a connected presentation. Research Report 14-B can be obtained from the Highway Research Board, 2101 Constitution Ave., Washington, D. C. at a cost of \$1.50.

Denver Sewerage

(Continued from page 77)

grade or direction and not in excess of distances efficiently served by standard rodding equipment. For simplicity on large projects, plans may omit many such details if a set of "as constructed" plans is furnished on completion of the work.

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Proposed grades and existing grades of streets and easements must be shown where these are not the same. The minimum cover must be shown and specified. Backfilling must not be carried above the springing line of the pipe until it has been inspected for alignment, grade and jointing. Sewer lines must be as nearly impervious to ground water as possible. Surface water and rain water from roofs, yards, areaways, lawns, streets or alleys cannot be admitted to the sewers. An infiltration rate of more than 10,000 gallons per day per mile of line precludes acceptance of the line.

Meters are required on nearly all connections, and these must record and indicate both flow variations and total flow. The plans and specifications must cover these facilities in detail. Exceptions to the requirement for meters are, for the most part, the very small areas already mentioned.

The approval of plans is valid for only six months. Therefore, plans and specifications are not submitted until the legal and financial arrangements necessary to qualify for making a Connector's Agreement are essentially completed and construction can begin within six months.

The City Engineer or any authorized employee can inspect the construction of any unit and the operation of the entire system at any reasonable time to insure that it is being constructed and operated in accordance with the terms of the agreement. To reimburse the city for such inspections, and for the work of reviewing the plans and specifications, certain fees are charged. First is a filing fee of \$10; there is also an agreement processing fee of \$25; and there is a supervisory inspection fee of one-half of one percent of the contract price, payable upon the award of the construction contract and prior to beginning work. Also there is charged an inspection fee in accordance with the current inspector charges of the city. This is payable for all of the time that an inspector is placed on the job by the City Engineer's office.

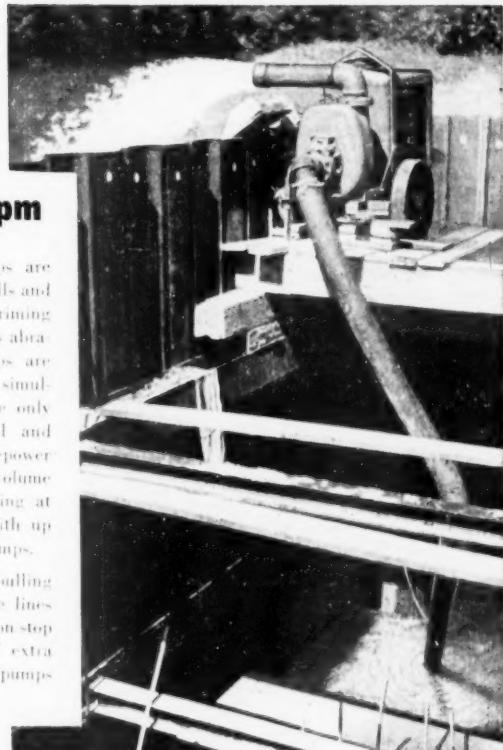
A permit fee of \$3 is charged for every sewer service connection permit, except for those municipal and quasi-municipal corporations which maintain adequately their own record of permits and accounts and which have established procedures for the installation and inspection of sewer service connections.

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What the Weather Consultant Can Do

(Continued from page 76)

plants and crews to go ahead with the work.

In this case, the city engineer gained a full day of work, but such information can work both ways. On another bright and sunny morning the municipal weather consultant warned the engineer that: "Heavy rain squalls were just west of the city and could be expected to hit about 10 am. Streets would

remain wet until late afternoon." Knowing that such conditions would make operations worse than useless, work was cancelled. The men were reassigned to other work or dismissed for the day, with substantial savings in labor costs.

In much the same manner, road oiling operations can be regulated on the basis of the weather consultant's advice, with resulting savings. The Highway Commissioner of Waukesha Co., Wisc., has repeatedly used such specially detailed weather information to plan his operations. On one particular

occasion, the radio forecast predicted showers throughout the general area. The Commissioner called the county's meteorologist and was informed that there would be no further rain in the county that day. A full day's oiling operation was carried out. Waukesha Co. has been using a weather consultant for five years with outstanding success.

Comparable stories can be told in regard to other municipal operations, including weed-cutting, street sweeping, sewer excavation, grading, many kinds of outdoor construction and even traffic control. All can profit from detailed information supplied by a weather consultant.

It is reasonable to ask how the consulting meteorologist can solve such weather problems. It is not a case of black magic—no more than paving a road or designing a sewage treatment plant. First and foremost, the consulting meteorologist is an engineer trained in applying weather knowledge to specific problems. As a professionally qualified meteorologist, recognized by the American Meteorological Society, he is licensed by the U. S. Department of Commerce to receive, as his basic information, the teletyped weather observations transmitted over the Civil Aeronautics Administration's long-line network.

More than ever, that ancient adage about nobody doing anything about the weather is losing its meaning. The advent of the consulting meteorologist with his engineering background, new techniques and wealth of basic data has cured many an industrial, commercial and municipal headache. The public works administrator is making increasing use of the knowledge available from this source. In many parts of the country, weather consultant firms have specialized in the type of weather forecasts required by public works operations; and they have shown that such forecasts can be a potent factor in reducing costs and speeding up work.

• • •

Truck-Mounted Shovel is Fast and Maneuverable

A highly useful piece of equipment is reported by C. R. Woodman, Town Manager, Mexico, Maine. A unit $\frac{1}{2}$ -yd. shovel, with backhoe, was purchased and mounted on a 6 x 6 Diamond T truck. This is easy to handle and speedy in moving from place to place.

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City	Oldest Pipe in Service (1953)
Baltimore, Md.	113 years
Boston, Mass.	106 years
Buffalo, N. Y.	102 years
Chattanooga, Tenn.	89 years
Chicago, Ill.	101 years
Cleveland, Ohio	97 years
Detroit, Mich.	115 years
Indianapolis, Ind.	82 years
Jersey City, N. J.	91 years
Louisville, Ky.	93 years
Lynchburg, Va.	124 years
Mobile, Ala.	123 years
New York, N. Y.	120 years
Philadelphia, Pa.	131 years
Pittsburgh, Pa.	104 years
Portland, Ore.	87 years
Reading, Pa.	120 years
Richmond, Va.	121 years
Sacramento, Calif.	100 years
St. Louis, Mo.	117 years
San Francisco, Calif.	94 years
Washington, D. C.	94 years

*Original Cast Iron Mains Still In Service



CAST IRON GAS MAINS

City	Oldest Pipe in Service (1953)
Atlanta, Ga.	98 years
Baltimore, Md.	119 years
Boston, Mass.	117 years
Brooklyn, N. Y.	104 years
Cambridge, Mass.	101 years
Charleston, S. C.	115 years
Chicago, Ill.	103 years
Cincinnati, Ohio	97 years
Indianapolis, Ind.	100 years
Louisville, Ky.	114 years
Macon, Ga.	101 years
Manchester, N. H.	101 years
Moline, Ill.	99 years
Nashville, Tenn.	99 years
Newark, N. J.	105 years
Philadelphia, Pa.	118 years
Providence, R. I.	105 years
Richmond, Va.	95 years
St. Louis, Mo.	96 years
San Francisco, Calif.	93 years

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PUBLIC WORKS DIGESTS

THE SEWERAGE AND REFUSE DIGEST

City Practices In Refuse Disposal

This article analyzes replies from 618 cities to questionnaires concerning their practices in collecting and disposing of refuse. In collecting, something over two-thirds of the cities collected by municipal forces. In those using contract collection, the coverage of homes was far less than by municipal collection. (Similar data in 1940 showed only 36% of the cities reporting as having municipal collection). In nearly 70% of the cities, the cost of refuse collection and disposal is paid out of the budget. In disposal, 31.2% use sanitary fill, 11.8% incineration, 52% dumps. Many, probably most, of the rest use hog feeding. No reliable data seem to be available as to the amounts of garbage and refuse per capita that is collected. When amounts are recorded by volume, the increasing use of packer-type trucks introduces a factor of considerable importance.

"City Practices for Refuse Collection and Disposal." PUBLIC WORKS, October.

Portland's Sewage Treatment Plant

The conditions affecting the degree to which the sewage of Portland, Ore. should be treated and the methods of treatment practicable are unusual. The effluent is discharged into one of the largest rivers of the country, which is saturated with dissolved oxygen and is not put to any use below the city which makes sewage pollution an important consideration. The plant provides primary treatment by sedimentation and separate sludge digestion, with the unusual feature that the digested sludge will be discharged into the river during favorable river stages; it being believed that it will not form putrefactive sludge banks or cause objectionable sight and odors. Port-

land's sewers are practically all of the combined type. Intercepting sewers were designed to carry to the disposal plant $2\frac{1}{2}$ times the dry-weather flow, the remaining storm flow discharging directly into the river, which will occur about $4\frac{1}{2}\%$ of the time.

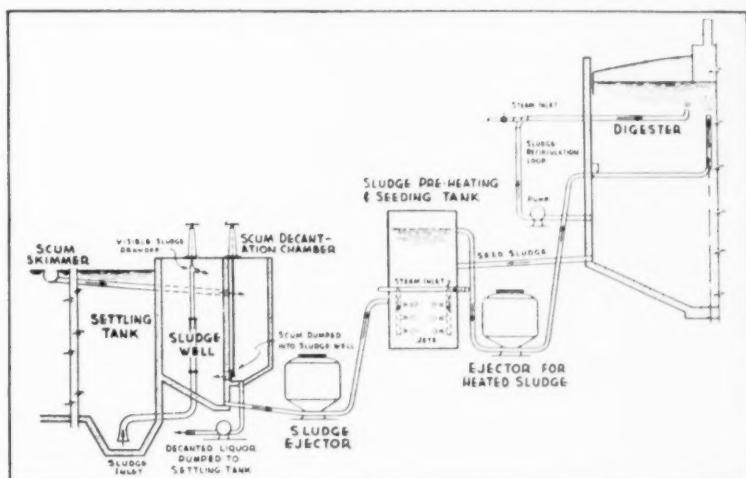
Rectangular sedimentation tanks provide $1\frac{1}{2}$ hours detention. Telescopic pipes provide visible sludge drawoff. Air-operated ejectors lift the sludge to preheating tanks, where it is preheated by live steam, then lifted by ejectors to the digesters. Scum removed from the settling tank flows to decantation wells. When the scum rises to the top of these, the liquor below is pumped back to the inlet channel. All pumping of raw sludge is done by air-operated ejectors, because they are completely automatic, with variable capacity; are the most nearly clogless pumping device available; are odorless, and require a minimum of maintenance. These advantages are considered to more than offset their low over-all efficiency. Every effort was made to

reduce odors about the plant. Power ventilation is provided at the grit and screen house, the sludge transfer buildings, the outlet ends of the pipe tunnels, and the large basement control room. The cost of the plant, \$1,295,360 exclusive of site, or \$20.80 per million gallons is considered quite low, even though it provides only primary treatment without sludge drying or chlorination equipment.

"The Portland Sewage Treatment Plant," by John W. Cunningham, *Sewage and Industrial Wastes*, September.

Effect of Detergents On Sewage Treatment

Reporting on the conclusions from studies conducted at the experiment station of Rutgers University, the author says that the action of detergents depends on the type—anionic, nonionic or cationic—present in the sewage, and its concentration. In general, replacement of soap by detergents will reduce the BOD of sewage by approximately



Courtesy Sewage & Industrial Wastes.

● FLOW diagram of treatment plant at Portland, Ore., showing sludge handling.

15 to 50 ppm. Settling devices may be affected, producing a poorer effluent and projecting an increased load to the secondary units. Gas yields from anaerobic digestion may be diminished, without inhibition or retardation of the digestion process. Anionic and nonionic detergents interfere with chemical coagulation of sewage in terms of purification attained and modification of the floc formed. At an increase in dosage of coagulant can alleviate some of these adverse effects. Repeated additions of anionic and cationic detergents cause a decrease in oxidizing, purifying and nitrifying capacities of activated sludge, accompanied by a general deterioration of its physical and biological properties. Oxidizable nonionic detergents induce no detrimental action on activated sludge or its activities. Interaction of anionic and cationic de-

tergents tends to diminish the inhibitive action of these agents on oxidation by the activated sludge organisms. The bactericidal effect of chlorine is increased by cationic detergents, but little if any by anionic or nonionic ones.

"The Effects of Detergents on Sewage Treatment Processes;" by Raymond Manganelli, Experimental Station, Rutgers Univ. *ASTM Bulletin*, September.

Incinerating Raw Sludge with Garbage

Bloomsburg, Pa., has built a combined sewage treatment plant and incinerator. The sewage contains a substantial amount of wastes from canneries and a carpet mill, and chemical precipitation is used. The sludge is not digested, but is concentrated in tanks to a solids content of 4% or 5% and vacuum filtered.

The filter cake is flash dried and either sold as fertilizer or burned in the incinerator along with the city's garbage. Heat from the incinerator is used for drying the sludge. Omission of digestion tanks reduced the cost of the plant considerably and enables it to treat wastes that might disturb the digestion process. Another economy was effected by equipping 2 of the 3 pumps with variable-speed magnetic clutches, permitting speeds ranging from 500 to 1350 gpm. Drying is done in a Raymond flash dryer, and the incinerator is a Nichols Monohearth.

"Double Duty Sanitation;" by S. I. Zack, Chf. San. Engr. *American City*, September.

Protozoa As Indicators

Early in the history of activated sludge it was recognized that the types of protozoa fauna associated with the sludge afforded useful information as to its content. Investigation was made at the Coleshill works of the Birmingham Tame and Rea Drainage Board (England) to see if any definite relationship could be discovered between protozoan numbers and sludge conditions or effluent quality. Observations for a period of more than a year indicated that such a relationship did occur but cannot yet be expressed on a quantitative basis. Furthermore, the proportion of free-swimming to total vorticellids does not appear to be related to the dissolved oxygen concentration, although this proportion is in some way related to the degree of aeration.

"Protozoa as Indicators of Activated Sludge Treatment;" by S. Baines, H. A. Hawkes, C. H. Hewitt and S. H. Jenkins, Biologists and Chemists of Drainage Board. *Sewage and Industrial Wastes*, September.

Irrigation of Food Processing Wastes

It is believed that the first use of spray irrigation was in 1947 by the Hanover, Pa. Canning Co. By 1952, 42 plants in the canning and frozen food industries were using spray irrigation. This method requires suitable land, with a vegetative cover crop to aid absorption and prevent erosion; a mechanically operated screening unit; a surge tank or pit; auxiliary stationary screens; a pump to develop the required sprinkler nozzle pressure; and a main line and lateral lines.

Concrete Saw Cuts Pavement at 2½ Ft./Min.

TO improve the center section of a street in Santa Rosa, Calif., which had settled due to water main failure, a concrete saw was used. The job of pavement removal involved sawing 1800 ft. of 9-inch macadam base and asphalt surfacing. This was cut to a depth of 3½ ins. The entire cutting job was completed in 12½ hours, at an average rate of speed of 2½ ft. per minute.

The work was done by Chester S. Yardley of Santa Rosa, using a Clipper concrete saw and diamond blade. Since traffic had to be maintained, all sawing was completed before "breaking out" the section. To prevent the asphalt welding together again under truck traffic in the 90° heat, fine sand was sifted into the finished cut as the cutting of the pavement progressed.



with self-actuated revolving sprinklers operating under 35 to 100 psi nozzle pressure. Absorption of the sprayed wastes by the land is a vital point. Planting to grass of kinds that will stand considerable moisture is desirable. With fairly level land having a good cover crop, it is common practice to apply, at intervals of about 6 days, from 3 to 4 in. of waste water at a rate of 0.4 to 0.6 in. per hour. Dairy cows are pastured on spray-irrigated fields, with a 10-day interval between spraying and pasturing.

"Disposal of Food Processing Wastes by Spray Irrigation;" by N. H. Sanborn, National Canners Ass'n Research Laboratory, *Sewage and Industrial Wastes*, September.

Plans for the Allegheny County Treatment Plant

Detail plans are nearing completion for a plant embodying the La-boo-n process for treating the sewage to be collected by the Allegheny County (Pa.) Sanitary Authority. This process consists of heating raw sewage sludge to 95°, which will cause practically all solids to float to the top for the first five days or more. Then the relatively clear sub-natant will be drawn off, and the sludge (16% to 24% solids) will be concentrated and burned in an incinerator. Sludge from primary sedimentation tanks will be pumped in 4 in. pipes back and forth through steam chests to bring the temperature up to 95°, and then to concentration tanks. These tanks have sloped saw-tooth bottoms, the valleys of which contain screw conveyors. While the sludge is floating the subnatant will be drawn off and the sludge will settle into these valleys and be conveyed to helical-rotor pumps, which will pump it to the incinerator. Air from the building housing the concentration tanks will be passed through the incinerator to destroy the odors. The pumping station will be circular, the 6 pumps being set in an annular dry well surrounding a circular wet well more than 100 ft. deep.

"Novel Sewage Works Comes Off Drawing Boards." *Engineering News-Record*, October 1.

Composting Municipal Refuse

European methods of composting are not suitable for United States cities. The refuse composted in Holland contains little vegetable matter. In Denmark the composting is done largely by the farmers them-

selves. The Becari (Italy) and Verdier (France) processes have been tried in this country and found to be unacceptable. The Indore process of India and South Africa uses night soil and hand labor. Many methods proposed in the United States involve unfounded claims of questionable merit, and involve inoculation with special organisms, seeding with manure, recirculation of liquids and gases, forced aeration, and addition of enzymes and hormones. Research and tests in California have developed a recommended process in which thermo-

philic aerobic micro-organisms reduce organic matter to a fairly stable humus, quickly and without nuisance. It includes segregation, grinding, stacking, aeration by turning, and regrinding. The time required depends upon the C/N ratio, and laboratory tests are necessary. Practically all of the operations are performed mechanically by equipment, much of which is already available.

The cost of composting can, it is thought, be reduced to somewhat below \$15 a ton. Finished compost is more valuable as a soil conditioner

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than as a fertilizer. It can be converted to a legal fertilizer by additives, but the cost of this is such that it probably would not pay. As a conditioner, farmers could probably afford to pay \$10 to \$15, possibly a little more, per ton. There is reason to believe that the market for compost would expand faster than the production will develop. All things considered, composting represents a very hopeful method for reclaiming municipal refuse economically while producing something immensely valuable to agriculture.

"Possibilities of Composting Municipal Refuse," by P. H. McGaughey and C. C. Goleuke, San. Eng. Research Project. PUBLIC WORKS, October.

Cooking Garbage For Hog Feeding

Several state health departments require the heat treatment of garbage that is to be fed to hogs. On a large hog farm near Cheyenne, Wyo., the garbage is steamed in the trucks that bring it, before taking it to the feeding pens. For this, they use a rig consisting of a number of $1\frac{1}{2}$ -in. vertical pipes connected to headers,

which pipes are lowered into the garbage and discharge into it steam which permeates the whole mass (which meantime is covered with a tarpaulin) for 30 minutes after bringing it to the boiling point.

"Cooking Rig Prepares Garbage for Hog Feeding." American City, September.

Underground Disposal of Chemical Wastes

Early in 1951 the du Pont Co. started operations of a chemical plant on the Guadalupe river near Victoria, Texas. It spent \$1,600,000 on waste treatment facilities to prevent contamination of the river. Its disposal system involves three unusual features: 1. Concentrated aqueous wastes are disposed of by injecting them into subterranean sands through a deep well. 2. Solar evaporation is employed to dispose of a number of dilute aqueous waste streams. 3. Biological surveys are made of the river above and below the plant site and of the bay at the mouth of the river. One of the waste waters is about 80,000 lb. per hour of a brine containing about 18% sodium chloride along with traces of metallic salts and organic com-

pounds. This is to be injected into underground sands through a well 4,800 ft. deep; the brine first being freed of suspended solids and made stable, sterile and unreactive with the natural brine and underground sand. This method is yet to be proven, but there is every indication that it will work satisfactorily.

"Surface and Underground Disposal of Chemical Wastes at Victoria, Texas," by H. O. Henkel, Technical Section, du Pont de Nemours & Co. Sewage and Industrial Wastes, September.

Treatment Control by Oxidation-Reduction Potentials

The oxidation-reduction potential of a sewage describes the state of oxidation of the sewage according to the fundamental electronic concept of matter. It is a relatively new tool in the field of sewage treatment. During the past four years the laboratories of the Dept. of Public Works of New York City have been studying the possibility of applying it to the better control of sewage treatment processes and increased efficiency and economy in operation. The author describes how it can be used to control aeration in

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the activated sludge process, including step aeration. It was found that if the activated sludge is well oxidized, as shown by a high level of oxidation-reduction potential of the aeration tank effluent, the ORP of the returned sludge will be high, other factors being equal. Sewage increments may be so distributed among the several aeration tank inlets in the step-aeration process as to give increasing peak values of ORP through the aeration tank. ORP measurements may be used to control the volume of the sewage added at each point so that it will allow a recovery of ORP in the subsequent period of aeration to a value slightly greater than that prevailing before the addition of the sewage.

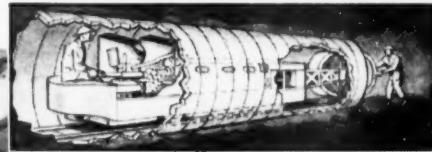
"Application of Oxidation-Reduction Potentials to the Control of Sewage Treatment Processes," by Frederick E. Nussberger, Sr. Chemist, Dept. of Public Works, N.Y.C. *Sewage and Industrial Wastes*, September.

Treating Phenolic and Sanitary Wastes

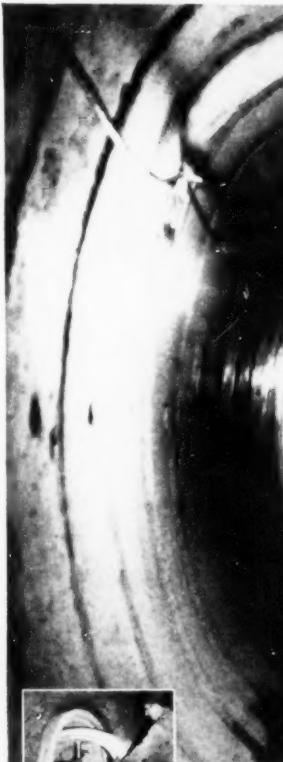
In designing a plant to treat the wastes from a municipality combined with those from coke ovens and a steel mill, the phenol wastes from the coke ovens were considered to be a substantial governing factor. For treating these, it was at first planned to use the activated sludge method; but laboratory work indicated that the newer biosorption process would be superior in reducing phenols; the rate of removal appearing to be dependent upon whether or not the sludge has had previous contact with phenol and the state of nutrition of the sludge. The biosorption process apparently would require a smaller plant; but to be on the safe side, the plant has been designed of capacity to treat all the immediate flow of wastes from both steel mill and municipality, 475,450 gpd, by the activated sludge method, providing also for testing the biosorption method in actual service. Then, when the volume of wastes increases, the existing plant will still have sufficient capacity to treat it by this process if this seems desirable; or it can be enlarged for activated sludge treatment. For activated sludge, the plant provides primary and final settling of 2 1/2 hr. each, and a 10-hr. aeration period. For biosorption, a total sludge conditioning period plus activation with sewage of 5 hr. is provided, followed by 2 1/2 hr. sedimentation; thus requiring but one-half the plant capacity.



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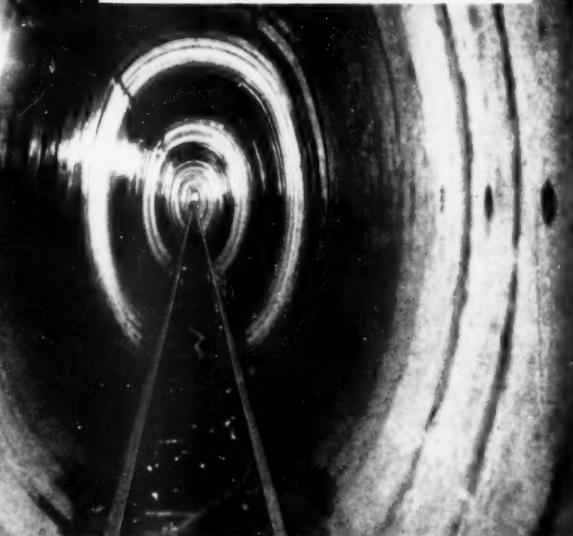
Worker guides section carried forward by Lamar Tunnelugger.



Section is easily tilted upright on *Tunnelugger* arm.



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"Sewage Treatment Plant for Steel Mill Wastes;" by Daniel M. Vail, Project Engineer. PUBLIC WORKS, September.

Tonnage Oxygen In Sewage Treatment

"Tonnage oxygen" is the relatively new term given to oxygen gas of about 95% purity which is produced at a relatively high rate to be used continuously at or near the site of production. There has been a sharp drop in the cost of producing it because of recent improvements in the mechanical equipment required,

increased size of installation, elimination of compressing it into cylinders, and production at a lower purity. Since 1948 about a dozen plants have been built, ranging in size from 20 to 2,000 tons per day. Published costs of manufacture range from \$5.00 to \$8.30 per ton. It is claimed that its use in biological treatment would be advantageous because, while the oxygen concentration in sewage at normal temperatures and pressures is only about 8 ppm, when fully saturated and exposed to air, the solubility of oxygen under similar conditions is

5 times as great. Saturating sewage with oxygen in a tank will provide at one contact much of the oxygen required to satisfy the BOD.

A basically new process has been devised for making economical use of tonnage oxygen in biological sewage treatment. In this, called the bio-precipitation process, the sewage is pre-oxygenated, using tonnage oxygen. The tank contents are not circulated, as in the activated sludge process; the biological floc is kept in suspension in the unturbulent upward flow of the sewage, and is not settled out in final sedimentation tanks. It is estimated that the plant for the bio-precipitation process need be only about one quarter the size of an activated sludge plant. Operation of a full scale plant is needed to learn the amount of tonnage oxygen required and its cost.

"Use of Tonnage Oxygen in Sewage Treatment;" by Daniel A. Okun, Assoc. Prof. of San. Eng., Univ. of No. Carolina. Water & Sewage Works, September.

• • •

Studies of Duck Wastes Treatment

A cooperative study of the treatment of duck wastes was carried on in Long Island, N. Y., during 1952, from which the following conclusions have been reported:

(1) The settleable solids content of duck wastes varies widely, depending upon the quantity of water used on the farm, the rainfall and the activity of the ducks in the water. When the duck runs are low and ducks are active in the water, settleable solids may equal 10 per cent of the wastes volume. The quantity of putrescible organic materials, as measured by the 5 day BOD determination, averaged 20.6 pounds per day per 1,000 ducks on water. Thus, on the basis of BOD, the pollution effect of the discharge from eight ducks is equivalent to the sewage discharge from one person. The quantity of suspended solids averaged 96 pounds per day per 1,000 ducks on water. This is half that discharged in sewage for each person contributing or on the basis of suspended solids the pollution effect of the discharge from two ducks is equivalent to the sewage from one person.

(2) Sedimentation of the wastes in a compartmented settling tank with a detention period of 1½ hours will remove 95 per cent of the settleable solids; in an Imhoff tank with a detention period of 30 min-

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utes, 90 per cent of the settleable solids; in a lagoon with a detention period of one hour, 80 per cent of the settleable solids. The sludge produced will probably average about 12 cubic yards per million gallons of waste. The sludge will average 20 per cent solids and be very difficult to handle by an ordinary, conventional sewage sludge handling equipment.

(3) The sludge can be digested to produce an inoffensive quick-drying residue. However, the digestion process will produce offensive odors, large amounts of hydrogen sulfide which will be corrosive to metals and will require large quantities of lime and careful control. If the sludge is not digested, it will produce acids in sufficient quantity to prevent further digestion for a period of at least 48 days. Sour, disagreeable odors will be prevalent near the accumulated sludge.

(4) The wastes can be clarified by coagulation with alum, using between 1250 and 2500 pounds per million gallons. Coagulation, with alum also reduces the phosphate concentration to less than 0.2 p.p.m.

• • •

Brush Rake Expedites Right-of-Way Clearing

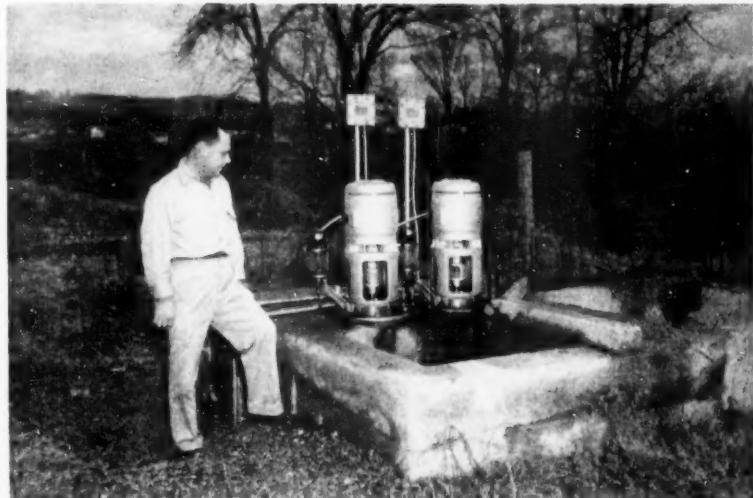
A brush rake, designed and built by J. V. Wilson of Rush Springs, Oklahoma, is being used by Walco Engrg. & Constr. Co., Tulsa, in clearing the right-of-way of 124 miles of electric line. The rake is made of



• RAKE speeds R.O.W. clearing.

five 90-pound rails. These are fastened to the top of the dozer blade by a hinge and extend 18 ins. below the edge of the blade. They are mounted on an International tractor. When the tractor backs up, the rake swings up to dump the collected trunks, limbs and most of the twigs. Much hand labor is eliminated and costs are reduced with this equipment.

Modern Sewerage System serves 695 people



• THIS is the sewage pumping station, with Floyd Bailey, Sup't. of Public Works.

WITH a total population of only 695, Blountsville, Ala., has put into operation a sewerage gathering and disposal system constructed at a cost of approximately \$56,000. An important part of the system is an automatic pumping station with two motor-driven Fairbanks-Morse bladeless impeller sewage pumps.

In planning the system, economy was necessarily a major consideration but only insofar as it was consistent with sound design and sturdy equipment. The sewage collection lines were the largest item on the bill. Two lines were constructed, both of clay pipe, one 8-inch and one 10-inch. Initially, these lines serve only 61 homes but they are located so that additional dwellings can be tied in at small cost.

The lines carry the sewage by gravity to the outskirts of town where the pumping station and disposal facilities are located. Sewage flows into a concrete sump, then through a screen into the concrete pump suction chamber. Here the sewage is picked up by one or both of the two 4-inch Fairbanks-Morse vertical sewage pumps and is lifted into a concrete septic tank. After settling, the effluent is discharged by gravity through a screen into the nearby stream. The solids are pumped from the settling tank to adjoining sludge drying beds from time to time, as necessary.

In a community of 695 people, the operating expense of any municipal service must be kept to a minimum if the service is to be economically feasible. The sewerage system requires little or no attendance. Each of the vertical sewage pumps is driven by a 2-hp Fairbanks-Morse vertical motor. The town chose weather-proof motors that obviated the need for a pump house or shelter of any kind. The pumps are started and stopped as required by Healy-Ruff motor controls actuated by floats in the suction pit, these being so arranged that one pump comes on first and the second starts only if flow is too great for one unit to handle. Float settings can be altered quickly by a simple adjustment. This device also can be used to alternate pump work schedules.

A sewage pumping station functions automatically only if the pumps do not clog. In a village like Blountsville, where one man has varied duties and responsibilities in street maintenance and water supply in addition to operation of the sewerage system, it is particularly important to minimize pump clogging. To solve this problem, pumps with bladeless impellers were used. Public Works Superintendent Floyd Bailey reports that the two pumps at Blountsville have never clogged a single time in more than a full year of operation of the plant.

PUBLIC WORKS DIGESTS

THE HIGHWAY AND AIRPORT DIGEST

Novel Features In Concrete Paving Design

The West Virginia Turnpike Com'n. called for bids for both unreinforced portland cement concrete and for asphaltic concrete or penetration macadam for the first 30 miles of the 88-mile 2- and 3-lane turnpike. The specifications for the concrete pavement contained some novel features. At bridge approaches, heavy wire or bar reinforcement in the axis direction was called for to hold cracks from opening. Also included were reinforced panels of different lengths with two or three transverse expansion joints, the first joint 15 ft. from the abutment, the second and third at 75 to 30-ft. intervals; the reinforcing continuing 40 ft. beyond the last joint. Another unusual feature was sawed transverse dummy joints over box culverts that lie immediately under the pavement or with little cover between.

"Alternate Paving Bids Planned for West Virginia Turnpike," *Roads and Streets*, September.

Road Architecture for Giving Information to Drivers

The greater part of the September issue of *Wegen*, a Netherlands highway monthly, is devoted to "architecture" of brick pavements. ("Architectuur van Klinkerwegen"). Bricks there are available in colors from bright yellow to grey, brown, purple and red. For each road the most favorable color should be chosen—the brighter colors to improve dismal stretches, but not through beautiful scenery where they would distract the attention from the view. At junctions, the same color should be continued on the main line and a contrasting color on the branch. The pavement may be used as a traffic sign, by introducing a change of color or of arrangement of bricks, at approaches to intersections, railroad

crossings, "zebra" crossings, etc. Every change of pavement puts the driver on the alert; therefore changes should be made only where caution is wanted. Of pavements in general, the article says: The architects of modern roads who want to make roads on which quiet driving at high speed is possible were in the beginning inclined to make too monotonous roads (straight green tunnels). The newest motor roads in the Netherlands (where absence of hills invites long tangents), seem to have reached a high architectural level; slight bends and variations in vegetation give an agreeable liveliness to the scenery without obtrusiveness.

"Architectuur van Klinkerwegen," Dr.-Engr. D. Thoenes, *Wegen*, September.

Cutting Costs in Highway Landscaping

Costs of highway landscaping on New Jersey's Garden State Parkway have been reduced by recent changes in design standards and in specifications. Among the former, is flattening of slopes on low fills and shallow cuts. This enlarges the area over which the soil can be processed by machines, reduce erosion, and increase the amount of mowing that can be done by machine. Flat slopes are used also for the sides of ditches. By limiting the length of ditch between drop inlets to 400 ft. or less, they can be grass covered instead of paved without danger of erosion. Cost of top soil has been reduced by changing the depth from 6 in. to 4 in., which experience has shown to be adequate, and the amount of organic matter in it from 4% to 23/4%. For seeding, the former requirement of 200 to 175 lb. per acre has been cut to 125 lb. Practically no sodding is done. So far as possible, existing trees and shrubs on the right-of-way are preserved. Shrubs are planted in the wide median zone. In narrow

medians, there will be a steel-wire fence 4 ft. high, with Hall's honeysuckles planted at 1 1/2 ft. intervals to serve as a screen. Vines are considered preferable to hedges because of the cost of keeping the latter trimmed.

"Better Methods Reduce Costs on Highway Landscape Work," *Engineering News-Record*, October 8.

Special Drainage To Protect Farm Tiling

Most of the soils along the route of the Ohio Turnpike require artificial drainage. The only drainage for the "Old Black Swamp" which covers the western half of the route, consists of a network of drain tile and shallow surface drains outletting into excavated open ditches. These ditches are continually being cleaned and deepened, and the landowners are installing additional tile drains at greater depths. Construction of the turnpike divides this network of drains into two parts, and the inverts of its culverts and the tile crossing under it will be control points in future drainage improvements. The Turnpike Com'n., in consultation with the land owners, county engineers, U. S. Soil Conservation Service and the Ohio State University, developed criteria to provide a standard of design for reconstruction of the existing drainage systems. These criteria, with accompanying charts and drawings are given in full in the article.

"Special Drainage Along Ohio Turnpike to Protect Farm Tiling," by Henry N. Luebke, drainage engineer of the Com'n. *Roads and Streets*, July.

Winter Maintenance Of Streets in Rochester, N. Y.

Maintaining traffic in winter on its 647 miles of streets costs Rochester \$700,000 a year or more. A snow cover of 1 inch or more exists for



**THIS ARKANSAS TEAM
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UNION COUNTY, Arkansas, owns a fleet of ten Caterpillar machines, including tractors, scrapers and motor graders. The two Cat* No. 112s shown here are working on the Jones Lake Road, east of Eldorado. While one pulls ditch, the other follows, grading the slope. It's a good team job. The two machines maintain a total of 200 miles of road, 60% gravel and 40% dirt.

W. E. Stevens, at the wheel of one of the units, says: "I have been an operator for 23 years—13 years on Cat equipment. I think they're the *only* machines, because they're a lot easier to control and have less trouble. I've operated this No. 112 for three years without a single breakdown."

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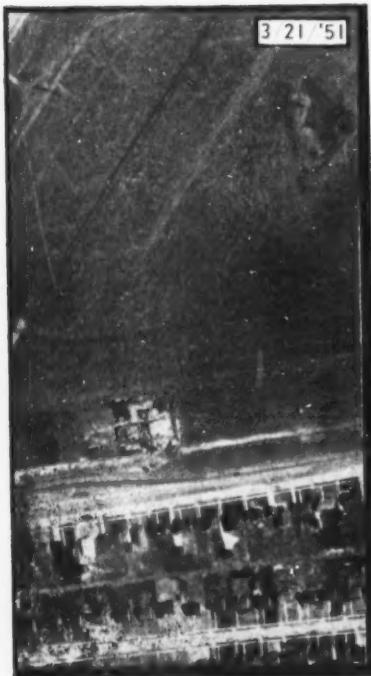
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80 to 120 days each year. The annual average snowfall is about 76 in. City-owned equipment plows 282 miles; hired trucks equipped with city-owned plows handle the others. Sidewalk plowing is done by contract. Rock salt with 1% Nalco inhibitor is used on 367 miles. Removal of snow from the central business district is done by snow blowers filling hired trucks, which dump it into the river. The cost of this snow handling and ice protection is assessed to property owners at the end of the season on a front foot basis.

The city owns 125 roadway plows, 6 snow blowers, and 12 mechanical-type salt spreaders. For communication, the city uses the regular telephone company service, the Police Bureau street telephones and radio system, and the Transit Corporation's street telephones; and has recently installed its own two-way radio system, with mobile radio units on all headquarters staff autos and service trucks.

"Prescription for Winter-Coated Streets," by John V. Lewis, Director of Maintenance and Operation, PUBLIC WORKS, October.

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Snow Handling In Minneapolis, Minn.

Minneapolis has a thousand miles of streets, and removes snow from approximately 100 miles. Last winter it experienced about 90 in. of snowfall. The snow removed in the Loop area is thrown into the Mississippi river; that removed in residential areas is placed on vacant property and parks and into sewers. Plowing is started as soon as the snow stops falling or 6 in. has fallen. After plowing, the windrows are loaded into trucks, using conveyor type loaders, of which the city owns 8. It also owns 6 rotaries, which it uses for throwing snow onto parkways and other available area along outlying streets. Small tractor-mounted rotaries are used for cleaning city-owned sidewalks, bridges, etc. Snow removal in the central business district is carried on between 11 P.M. and 7 A.M.; the public being notified beforehand of the streets to be cleared on a given night and signs "No Parking 10 P.M. to 8 A.M.—Snowplowing" being placed on the windrows in those streets. Cars found parking there after 10 P.M. are hauled away by a towing contractor, and violators are fined \$5.00 and costs, which total an average of about \$15.00.

For snow handling, the city owns 110 dump trucks and truck plows, 13 sand and salt spreaders, 25 motor graders, 10 front-end loaders, 6 rotary plows, 8 conveyor loaders, 7 jeeps with snow plows, and 19 other pieces of equipment. The downtown district and each of the five residential districts normally use 15 to 20 trucks and plows, 2 sand spreaders and 2 front-end loaders. The downtown district also uses 10 to 15 motor graders, 4 or more conveyor loaders and 2 large rotary plows.

"How City Engineer and Police Cooperate to Keep Minneapolis Winter Traffic Moving," by Hugo G. Erickson, City Engineer, Roads and Streets, September.

• • •

Leo Ritter

(Continued from page 18)

man had long been an active and vigorous leader in highway engineering education.

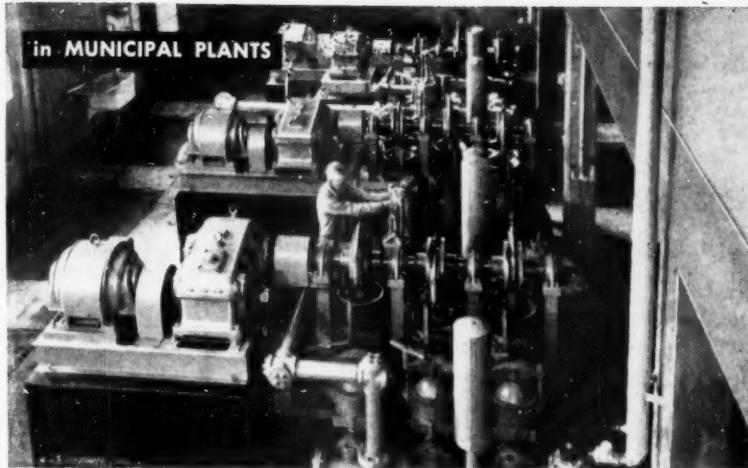
Intergovernmental Relationships—For a long time we have been strong advocates of increased understanding and real cooperation among all the many governmental agencies

concerned with highway and street problems in this country. Intergovernmental relationships in the highway field are of the utmost importance and have an appreciable effect upon the sound expenditure of highway funds. A highly significant recent publication in this field is Bulletin No. 66 of the Highway Research Board, which is entitled "Intergovernmental Relationships in Highway Affairs". The bulletin contains a paper by Norman Hebden of the Board and R. S. Lewis of the Bureau of Public Roads delineating principles which lead to better intergovernmental relationships. Principles presented are largely based upon a pilot study in Maryland. Significant in this field also is the study which is being undertaken by the Federal Commission on Intergovernmental Relations. This study is concerned with the functional and fiscal relations of the federal government to state and local governments, including federal aid for highways.

Kelly Ball — Ever hear of the Kelly ball? We hadn't either until recently, when we learned that this gadget, developed in California, threatens to replace the traditional slump cone for determining the consistency of fresh concrete. Originally the device was a six-inch cast iron ball, although it is now being made as a six-inch steel cylinder, weighing exactly 30 pounds. Advantages in field inspection which are claimed for this new device, over the slump test, include greater speed, permitting faster adjustment of mixes, and greater sensitivity, permitting the production of more uniform concrete. The "ball" can be used conveniently to detect segregation which may occur at any step in the field construction process.

Rhode Island Study — Least, but certainly not last, Rhode Island has recently engaged a nationally known research group to undertake a four-point study of the state's highway needs. Phases of the study will include an appraisal of the state's long-range highway needs, adjustment of the state's financial structure to meet highway needs realistically, proper classification of the various elements of the state's highway system, and the sufficiency rating of each segment of the various systems.

Construction Costs — A recent article in the New York Times reports an encouraging drop in highway



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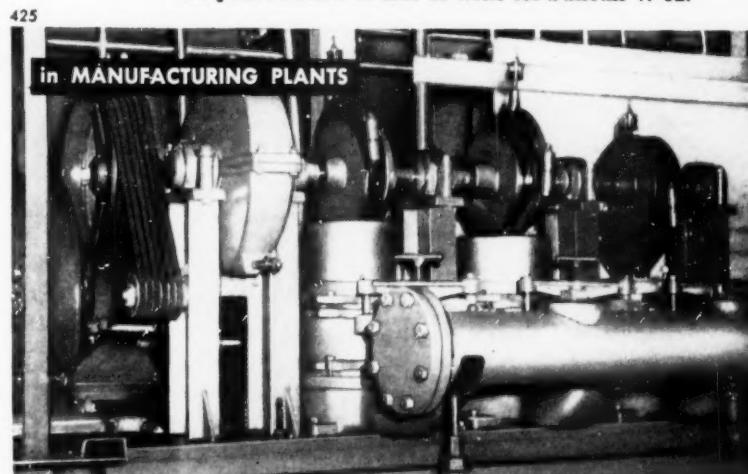
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construction costs. For the first time since 1949 construction costs have declined for the country as a whole; in the second quarter of this year they were 4.5 per cent below those of the first quarter. The official cost index of the Bureau of Public Roads dropped from 139 to 132 in the second quarter; the index is now based on 1946 as 100. Increased competition among contractors and ample supplies of materials and labor apparently are large factors in the downward trend. In many sections contracts have been let recently at prices 10 per cent or more below previously estimated costs. *California Highways and Public Works* reports that construction costs in that state during the second quarter of 1953 were only slightly below those of the first quarter; however, the California index for 1953 is thus far considerably below that of 1952. From the general standpoint, this situation is desirable in that more work can be accomplished with the same amount of money. However, many contractors take a somewhat different view, as evidenced by the lead editorial of the *Dixie Contractor* in the issue of September 16, entitled "Low Bidding among Contractors is Danger Signal. Not

Achievement." Main thesis of the editorial is that too many contractors in the southeastern states recently have been bidding contracts below the common-sense level. If true, this could have disastrous consequences for individual contractors and the construction industry as a whole.

BPR Training Program One of the outstanding training programs for young highway engineers in this country is that carried out by the Bureau of Public Roads. Thirty young graduate engineers are selected for the program each year on the basis of nationwide competitive examinations. After selection, each trainee is given the federal rating of GS-5 and begins the comprehensive three-year program. The first phase of the program takes about 16 months and is spent on construction surveys and design, frequently on a federal project in one of the national parks of the far west. After twelve months the trainee may be promoted to GS-7. The next six months are spent in the Physical Research Laboratory in Arlington, Virginia, followed by six months in the field on production cost studies. Six months more

are devoted to work on federal aid projects in one of the division offices. The final three months are spent in the headquarters office in Washington. The program is tremendously effective, as evidenced by the fact that of 66 men who have completed the program since its inception in 1946, only four have resigned.

Four of a Kind—If you will forgive the personal note, those of you whom I know personally may be interested in knowing that I became a proud father again recently. Nancy Jean was born in Hackensack, New Jersey on October 3. This gives me four girls. Man, in a few more years I won't be able to get a word edgewise around the house. Betty and the baby are both doing fine.

From Here and There—Work is progressing rapidly on the South Street viaduct which will link F. D. Roosevelt Drive with the Battery Park Underpass at the tip of Manhattan. Completion of this connection will relieve traffic congestion which had its origin many years ago when Fulton invented the fish market. A quotable quote is this one from a recent speech in St. Louis by A. C. Knetzger, manager

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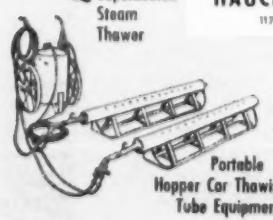
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of the local cartage carriers' association: "Because Oklahoma has a turnpike is no proof that Missouri needs one—for any reason. Our need is to be determined by our local conditions in this state...." Results of virtual around-the-clock construction operations in the resurfacing of the Northern State Parkway on Long Island were so successful that the New York State Thruway Authority is planning to use the same approach on one of its contract projects. Plan now to attend the two big meetings coming up soon—ARBA meets in Atlantic City on January 5-7 and the Highway Research Board in Washington January 12-15.

• • •

Chemistry

(Continued from page 78)

the elements can form more than one compound, a numerical prefix is used on the electro-negative term, as carbon monoxide (CO) and carbon dioxide (CO₂).

When more than one oxide can be formed, the ending "ous" is used to indicate the lower conditions of oxidation and the ending "ic" to denote the higher conditions. For instance, Cu₂O is cuprous oxide and CuO is cupric oxide. Sulfurous acid is H₂SO₃ and sulfuric acid is H₂SO₄.

The endings "ite" and "ate" are applied to the salts derived from acids ending in "ous" and "ic" respectively, as sodium sulfite (Na₂SO₃) and sodium sulfate (Na₂SO₄).

Where there are compounds that are still lower or higher in the scale, the prefix "hypo" is used to indicate those that are lowest and the prefix "per" those that are highest. For instance, in order of oxygen content we have hypochlorite, chlorite, chlorate and perchlorate.

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English Type Zebra Crossing Markings

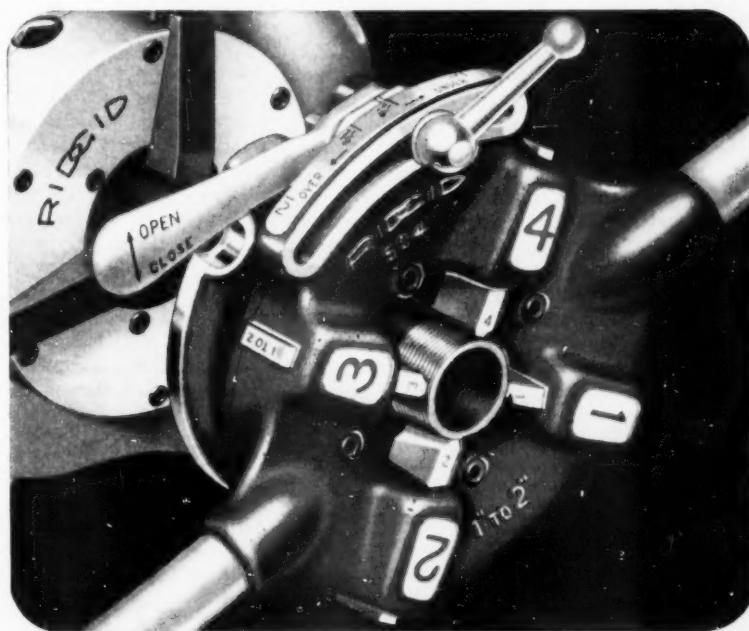
Via Spotlighting Traffic Safety comes the information that experiments with "zebra" crossings are being made at College Station and Bryan, Texas. The spaced bar stripes can be seen for three blocks by motorists in contrast with the half-block visibility for the commonly-used long thin stripes and rows, report the experimenters. Also, the prominent zebra stripes make pedestrians more observant of traffic regulations and give them a feeling of protection.

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Pay-As-You-Go Paving

(Continued from page 72)

a small bulldozer costing \$8,000 was also purchased on time warrants.

The time warrants are drawn to mature one year from date and, at the time of setting the tax rate, sufficient levy is made to pay the warrants. In this way machinery is obtained without dipping into the General Fund which is needed for operations and yet the cost is shared by all taxpayers.

Each summer, the City negotiates a temporary loan to pay the contractor for the asphalt topping. The topping and the curb and gutter are the only operations let to private contractors.

The unpaid notes from the property owners are pledged as collateral on the City's note from its Depository. These temporary loans are payable in 12 months and the collections from the property owners' notes are deposited in a special fund to pay the City's notes. This has proved very satisfactory and the City has met the payments on time each year.

Equipment Used In Paving

- 1 **Maintainer***
- 1 **Bulldozer, small crawler type.***
- 1 **Farmall Tractor***
- 1 **Ford Tractor***
- 1 **Water Distributor**
- 1 **6-foot Pulvi-Mixer**
- 1 **Sheep Foot Roller**
- 1 **3½ ton Pneumatic Roller**
- 5 **1½ ton Dump Trucks***
- 1 **1½ ton F.B. Truck***
- 1 **Asphalt Distributor**
- 1 **¾ c.y. Loader***
- 1 **1½ c.y. Loader***

*Equipment also used in street maintenance.

The topping is usually completed in early September for the year's program. The City has paid as high as 33½ cents a sq. yd., but the 1953 contract is only 26 cents. The current curb and gutter price is \$1.25 a lineal foot. The City owns the curb and gutter forms used by the contractor, and this keeps the price under that being paid by a number of surrounding cities.

James H. Cowan, the Director of Public Works, is the Registered Engineer in charge of the paving project. Fred Brook, Assistant Director of Public Works, and R. B.

Cooke, Field Engineer, have been associated with the program since its beginning and do the detail supervision on the project. They started working on the 1954 paving program about October 1, 1953, by selecting the streets desired to be paved, preparing the engineer's estimate, searching property records, etc. It is a never ending program and one the citizens of Pampa are very proud of.

Special Water Department Maintenance Truck

A special Water Department maintenance and construction truck is described briefly for us by D. W. Hostetter, Assistant City Engineer of Emporia, Kansas. This is equipped with side and back A-frame, with a dual drum winch. The side frame permits using the truck longitudinal with the trench, rather than having to back up the truck for rear end use, and placing it crosswise of the street or alley. With the side frames, motion of the load can be in any of six directions: up, down, longitudinally by moving the truck ahead or back, and to either side by the dual drum winch.



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PUBLIC WORKS DIGESTS

THE WATER WORKS DIGEST

Selecting Dry Chemical Feeders

The author gives in detail eight principal guides for selecting dry chemical feeding equipment. These are: 1. Define operational requirements (rate of feed, degree of accuracy required, records required, type of controls). 2. Storage capacity required (in chemical feeder, bag or bulk storage). 3. Choose best available location (providing gravity flow, or the minimum practicable pump or ejector head). 4. Type of installation (small unit feeder, or two-floor installation, or mechanical loading installation, or bulk storage bin installation). 5. Type of feeder (volumetric or gravimetric). 6. Accessories for desired operations (such as bin level switches, pilot lights, remote controls, dust collectors, etc.). 7. Information for manufacturers (chemicals to be fed, type of feeder desired, power available, etc.). 8. Evaluate proposals (does equipment meet the specifications? Will it provide the performance desired? Comparative annual cost of use, including maintenance, length of life, etc.).

"Guides for Selecting Chemical Feeders," by Paul A. Coffman, Chf. Engr., Omega Machine Co. *Journal, New England Water Works Ass'n*, September. *Water & Sewage Works*, September.

Filter Plant In a Mild Climate

Houston, Tex., in building its new water treatment plant, is taking advantage of a mild climate and adequate space by placing a large part of the plant out of doors without any enclosing buildings. There are three flocculation and settling basins, 12 filters and a pumping plant. Considerable piping is eliminated by building the filters parallel to the discharge ends of the settling basins and using the intervening space as a two-story channel for treated water and for wash-water disposal.

Clear-well and wash-water storage will be in outdoor steel tanks. Bulk storage of coagulant and lime will be in outdoor steel bins. Chlorine tanks will be stored out-of-doors but with shed protection against the hot summer sun. Activated carbon will be purchased in bulk and stored as a slurry in outdoor tanks. Vertical, mixed-flow, submerged pumps will be in outdoor stations. Drive units for rapid-mix chambers, also, are out-of-doors. However, the distribution pumps will be housed in a conventional station because of the large motors and to facilitate maintenance of horizontal pumps and cone check valves. There is an administration building, which houses the laboratory, central instrument panel, administration offices, men's locker rooms and classroom for operators.

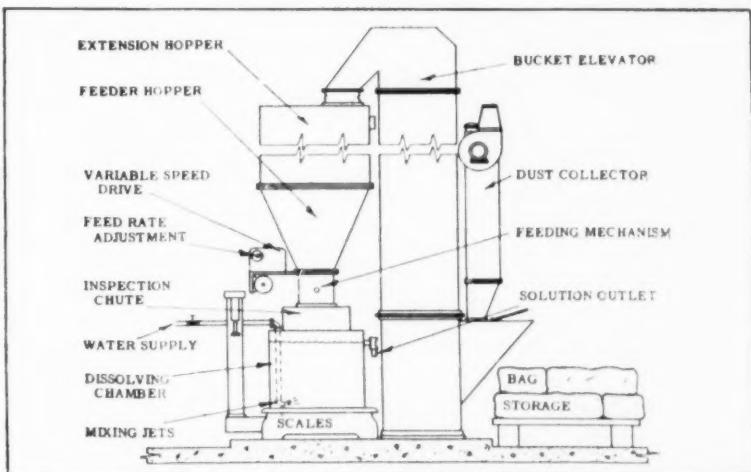
"Waterworks Gets Outdoor Industrial Look." *Engineering News-Record*, Sept. 10.

Universal Metering In Ottawa, Canada

From the first establishment of the Ottawa, Ontario, waterworks system in 1872 until the fall of 1952,

the water department supplied water to all consumers other than commercial under a schedule of rates based on the assessed value of the property receiving service. Since 1918 Ottawa has supplied water to several adjacent municipalities through master meters, and in all of these universal metering has been practiced. When, following 1949, these municipalities were consolidated with Ottawa, their citizens demanded Ottawa's system of water rates; also it was evident that either a considerably greater supply of water must be provided by constructing additional filtration and pumping facilities at an estimated cost of \$5,000,000; or waste must be reduced by universal metering, estimated to cost \$1,250,000. After overcoming strong opposition to metering by publicity through the newspapers, broadcasting stations, public meetings, etc., the metering program was adopted by the city council in 1952.

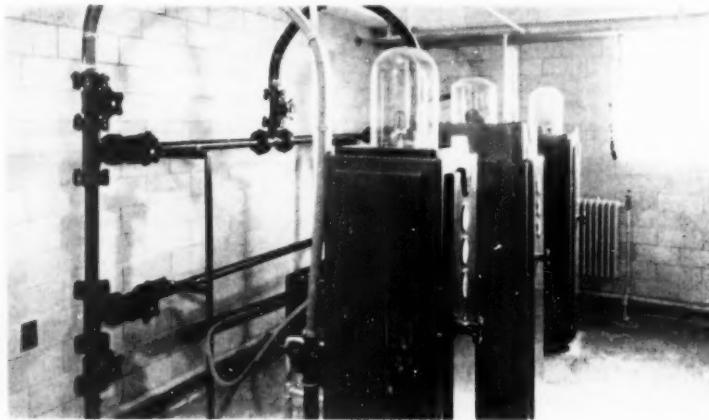
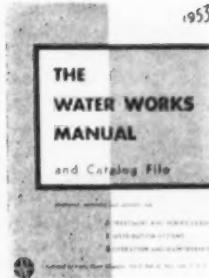
It was estimated that the cost of installing $\frac{3}{8}$ inch meters would average \$6.71; but the waterworks commissioner designed a new method of setting that was estimated to



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reduce the cost of labor 50% and give a total average cost of \$4.41. Bids received for installing 30,000 meters ranged from \$25.00 to \$6.00, exclusive of materials. These were rejected, and the department is installing them by the MacDonald method at a cost which will save the city more than \$60,000. The meter rate schedule probably will be strictly in accordance with the recommendations of the AWWA Committee on Water Rates.

"Introduction of Universal Metering at Ottawa," by W. E. MacDonald, Com'r of Water Works, *Journal, Amer. W. W. Ass'n*, September.

Revising Drinking Water Standards

The authors of two papers and a discussion of one of them which appear in the September issue of the AWWA Journal agree that the present standards for sanitary quality of water need to be revised. W. L. Mallmann considers the coliform test is satisfactory for municipal supplies (perhaps unnecessarily severe but easily attainable), but that a new yardstick is needed for rural water supplies, the presence in which of coliform organisms does

not necessarily indicate an unsafe supply. Max Levine thinks that there is a need, not only for re-evaluating the sanitary significance of the coliform group of bacteria, but also for a search for other indexes that might supplement or, in special instances, possibly replace the coliform index. That an acceptable standard should consider the problem of attainability as a factor. And that standards should not be applied arbitrarily as a substitute for appraisal of their applicability to situations under consideration. (Standards set for swimming pools, for example, are impracticable for bathing beaches).

Mallmann suggests the use of streptococci for measuring the sanitary quality of swimming pools; and that new media for the detection of enterococci that yield higher indices than media previously proposed be used for measuring fecal contamination where coliform tests have been unsatisfactory. And Gilcreas says that the information on water quality furnished by the quantitative results of a fecal streptococcus test is essential for the control of bathing waters; also that thorough investigations should be made of the quantitative relation-

ship of virus pollution to coliform pollution, and methods be developed for detection and enumeration of viruses in water.

"Water Quality Yardsticks," by W. L. Mallmann, Prof. of Bacteriology and Public Health, Michigan State College. F. W. Gilcreas, New York State Dept. of Health. Max Levine, Chief, Bureau of Labs., Hawaii Dept. of Health. *Journal, Amer. W. W. Ass'n*, September.

Restoring Aqueduct Capacity by Chlorination

In 1947 a 71-mile aqueduct was built for bringing water from the Colorado river to San Diego. The design capacity was 85 cfs. An extensive test made in December, 1947 indicated that under the maximum practicable head the aqueduct would carry 104 cfs, and this rate was maintained until June, 1948. At that time the capacity fell to 96 cfs, due, it was discovered, to biological growths in the pipe. On July 7, when the capacity had fallen to 94 cfs, chlorination of the water, as it entered the aqueduct, was begun, chlorine gas being fed into the pipe through a 2-in. rubber hose, at the rate of 3.5 to 4 ppm, which was

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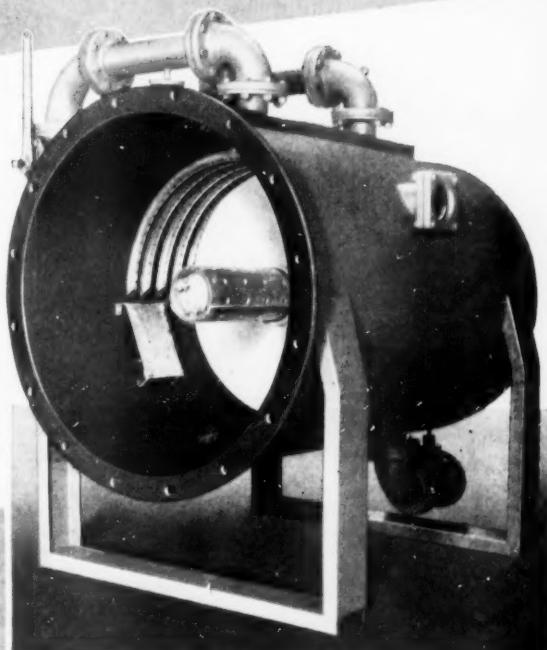
The model SCJ filter is a diatomite slurry feed filter designed to produce the highest quality pure water at a maintenance cost much lower than usually can be attained with older type filters.

This filter can be cleaned in two to five minutes either by flushing off with the built-in jet spray or by back-washing or a combination of both. The filter media is usually a synthetic cloth such as orlon which pre-coats quickly and washes clean rapidly.

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calculated to carry a free-chlorine residual of about 1.0 ppm to the end of the line. After 6 days the rate was reduced to 2.5 ppm. By July 19 the flow had increased to 99 cfs, and by November 1 was back to 104 cfs. On October 16 the chlorine dose had been reduced to 0.5-0.6 ppm, occasionally increased to 1.1 ppm, depending on the quantity of nitrogenous material present in the water. At times, especially in mid-summer, the flow would begin to decrease, but dosing at 3 to 4 ppm for 18 to 24 hr. has always restored the flow. For 10 months of 1951-52 a flow

rate of more than 106 cfs. was maintained. In 1951, based on experience here and at Little Rock, continuous chlorination was discontinued, and instead a dose of 2-3 ppm was applied for 2 hr. every day; and later the present practice was adopted of applying 2.2 ppm for 2 hr. twice a week. This maintains a very satisfactory flow with a total chlorine use of 200 lb. a week, as compared to 300 to 600 lb. per day when continuous low dosage of chlorination was practiced.

"San Diego Aqueduct Capacity Restored by Chlorination," by Lee

Streicher, Chf. Chemist, Met. Water Distr. of So. Calif. Water & Sewage Works, September.

Measuring Corrosion Rate of Steel

A recent laboratory study by the Nat'l Bureau of Standards proves for the first time that the rate of weight loss of a piece of steel corroding normally in soil can be measured electrically, without actually weighing the metal. The method is based on Faraday's law that the rate of weight loss from corrosion is proportional to the current flow through the soil from certain areas to areas of less negative potential. The total corrosion current can be determined from an equation based on the changes in slope of cathodic and anodic polarization curves.

"Corrosion Rate of Steel in Soil Can Be Measured Electrically," Water & Sewage Works, September.

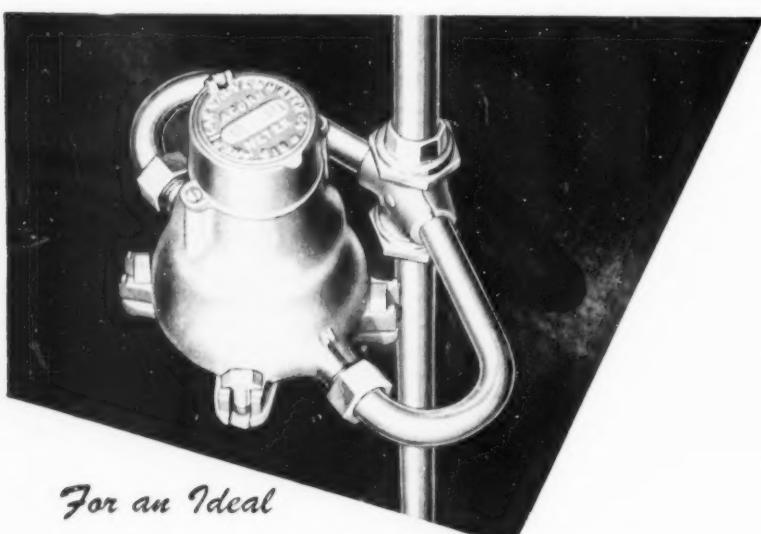
Army's New Purification Unit

As the result of more than five years of basic and applied research, the Corps of Engineers has developed a mobile water purification unit for use by the Army in the field. The unit consists of an upflow solids contact basin, two diatomite filters in parallel, chemical feeders, pumps and controls, all housed in an insulated and heated van-type body, mounted on a standard 2½-ton truck. Clear-well capacity is supplied by collapsible, rubber-coated fabric tanks, erected on the ground near the unit. A gasoline-burning heater prevents freezing in the clear well. The equipment is rated at 2400 gph at 68° water temperature. It provides for aeration, coagulation, clarification, filtration and disinfection, partial softening and removal of tastes and odors. Pulverized limestone is used in the operation to standardize raw water quality, lend weight to the suspended slurry and provide pH control. The filters will be back-washed by the "air bump" method.

"Army's New Mobile Water Purification Unit," Engineering News-Record, September 24.

Training and Certification of Operators

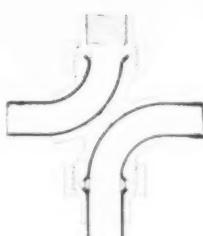
In-service training courses for waterworks personnel are to be found in almost every state in the country. The curricula include disinfection, filtration, taste and odor control, hydraulics, fluoridation, meter operation and repair, main



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disinfection, pumping, feed control, bacteriology, biology and chemistry.

Certification of treatment plant operators has proved to be an end result of in-service training. At present 23 states have certification programs, an increase from 5 seventeen years ago. But training of distribution personnel in practical methods of how to meet unusual circumstances in emergencies is infrequent. There should also be specialized training in management. Personnel should be encouraged to study in pertinent extension and correspondence courses. Certification should be of the compulsory type, administered by the state department of health; should be permanent unless revoked for cause. Certificate classifications should be uniform, as should examinations for certification in equal grades or classes.

"Status of Training Courses and Certification in the United States—Committee Report". *Journal, Amer. W. W. Ass'n*, September.

"Doc Symons"

(Continued from page 22)

operations and any move to saddle our citizens with meters is nothing more than insidious taxation." Sounds like a politician speaking, doesn't it—and I wonder how those people already metered feel about all that water being given away at flat rates.

★ ★ ★

Luminous Quote "The past is the father of today, and today begets tomorrow"—Herbert Hoover.

★ ★ ★

I Read Somewhere — "Water can be frozen at any selected degree between 0° and 32° F.—; it is the type of material—metallic or non-metallic—on which the water is frozen which controls the formation of ice."

Don't let it worry you, it's more important to aeroplane wing icing than to water works operators.

While in Chicago some years ago, I dropped in to see an old school mate, Harry Schlenz, V. P. of P.F.T. While in his office a man came in with the smallest pump I've ever seen. A triplex pump with a bore of about 1 4-in. and a stroke of no more; it developed a pressure of 200 psi and the darn thing had been pumping activated sludge for eight hours.—I don't believe they ever marketed the gadget, even as a paper weight, but I understand they do have something new in the

PFT-Pearth System for preventing scum formation in sludge digestion tanks by pumping sludge gas into the scum layer.

★ ★ ★

News Notes from Brushy Bend The Indiana District Water Works meetings were held during the last half of September at Marion, Michigan City, Terre Haute, Evansville and Batesville. Special attraction this year was a "How do you do it" program covering records and reports.

—The Lower Hudson Valley Section of N. Y. Sew. & Ind. Was.

Assn. held its Annual Clam Bake on Sept. 17 at Liberty Park, Liberty, N. Y., with a plentiful supply of clams, shrimp, fish and chicken.

—The Metropolitan Section of N.Y.S.I.W.A. held its annual plant inspection and dinner on Sept. 29th at the famous Lundy's Restaurant on Sheepshead Bay—lobster and chicken. An inspection of the Rockaway Pollution Control Project preceded the dinner and Ken Watson (G.E.'s coordinator of Waste Treatment) followed it.

—The Central Section of the Ohio Sew. Ind. Waste Treat. Conf.



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held a one-day meeting as part of a three day school, "The Eighth Annual Engineers, Sewage and Operators School for the Ohio Welfare Department". Earl Wittmer, San. Engr., State of Ohio Dept. of Welfare, directed the School which featured domestic and boiler water treatment, powerhouse maintenance and operation, power generation, public relations and a dozen other topics. P. S. In case you didn't know where Brushy Bend is, it's at the much talked about "Grass Roots Level". *

V.T.Y.—Doc Symons

How to get Public Employee Safety

(Continued from page 57)

employees) and in the case of divided operations, may have two or three such committees. All accidents occurring in the division or subdivision covered by a safety committee are immediately investigated by this committee to determine what caused the accident and what can be done to prevent similar occurrences.

In addition, these committees re-

ceive safety suggestions and complaints from employees, make area inspections and report suggested improvements in methods and work practice to divisional management. This arrangement, at the employee level, is most effective in assuring success to the program.

Akron's Safety Policy

Last year, the City of Akron, following the example of the City of Detroit, set forth a definite written safety policy through its Mayor-Manager Charles E. Slusser which has been reaffirmed by our present Mayor, Russell M. Bird. This policy outlined the responsibility of departments and division heads, of supervisors and of the employees themselves for safety plans and practices. Rather detailed procedures were outlined for dissemination of safety information, the handling of safety suggestions, the correction of unsafe conditions and the safety education of employees. It laid down the basic rule that "all employees shall be required, as a condition of their employment, to follow all safety practices which are established for the protection of themselves, their fellow employees and the public."

In the operation of the Akron Safety program, the Water Division has had an important and critical part with the result that, over a ten-year period, an encouraging downward trend in lost-time accidents has resulted.

City operations are similar to those of industrial establishments, and as such, have no valid reason not to use well-known and long established means of employee protection. There is no real doubt but that an individual city can do an outstanding and effective job in its own sphere of activity if its management will take the time. It is believed, however, that it could do a better job and produce better results if it received the stimulation to be had from group effort, opportunities for comparison with others in the field, and the mutual pooling of experiences and ideas.

Let us ask ourselves a few pointed questions:

Why Have Cities Been So Slow in Applying and Recognizing the Benefits of a Comprehensive Safety Program? Only the City itself can answer that question, and each City would have to answer it for itself. However, if a generalization is justified—and perhaps it is—it is

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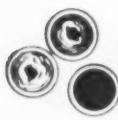


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that municipal agencies, like small industrial plants, service organizations and others—have been slow to grasp the relationship of active safety programs to both economy and efficiency of operation.

Are Cities Aware?

Does This Mean That Cities Are Not Alert to the Problem? Not altogether, but in the main, they have acted like small industries. To put it another way: most of the successful accident prevention programs are those carried on by large private employers. The reasons for this situation are complex. Competitive pressure is obviously one factor, centralized control and authority is another, modern cost accounting systems are a factor, and so are legislative and union pressures. The fact is, big industry—private industry—has a virtual monopoly on permanent and effective safety work. Small industry and cities must and will learn.

How Can This Apathy on the Part of Cities Be Changed to an Active Interest? Chiefly by positive, insistent demand from the top executive management of the political government involved. It is an axiom in the safety business that an organization has no more employee injuries than top management will allow. If top management exemplifies no regard for the safety of its employees, unsafe conditions will breed employee injuries.

Does Not This Place An Undue Burden on Management? Not at all. Some lazy managers may think so, but since a good safety program is part and parcel of the overall problem of conducting a successful business, it will force recognition and acceptance upon any manager. It is just as important as selecting a proper product, a suitable factory site or the purchase of necessary tools, equipment and materials. Therefore, a positive demand on the part of the chief executive of a state or municipality will be translated into an equally active interest on the part of supervisors through the usual channels of training, upgrading, persuasion, and other conventional devices by which executive orders get carried out.

Does It Follow That A Safety Program Is Good Business? Obviously; if safety programs were not good business, the wealthiest, most powerful, most competitive industries in the world would not be supporting them with large budgets for

the setting up of safety departments, the hiring of trained personnel and the insistence upon safe procedures in industrial processes.

Safety programs are even more than good business: they are good employee relations, good public relations, and good protection against legislative control. A man who has his house in order need not fear the approach of authority to make it so.

How May A Safety Program Be Applied By the Small City Which Cannot Afford A Safety Director?

Safety is not necessarily a specialty, it is generally a corollary of common sense. Almost any competent Administrator, and any competent department foreman, knows enough about how to do the job right and to do the job safely, to get it done that way. Safety, in its essence, is simply doing an operation correctly—under control. Accident prevention is nothing more nor less than the control of an operation, which likewise involves control of persons and their potential unsafe acts. It is part of the plan of procedure.



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Sanitary Landfill in a Small City

Newton, Iowa, a town of 12,000 population, in changing from city dumps to sanitary land fill in 1952, made use of an abandoned strip mine three miles outside the city limits, which averaged 100 ft. wide and was 20 to 30 ft. deep. One advantage of this site was that the spoil bank on one side of the mine furnishes cover material. The fill is built up in lifts 5 ft. or less high and about 8 ft. wide. To perform all the services of compacting the refuse, covering it, compacting the cover and grading the area, they use a bulldozer shovel mounted on an International tractor. About 100 cu. yd. of garbage and refuse are brought here each day. It takes about 30 minutes at the end of each day to cover this with 2 or 3 inches of dirt.

• • •

Erosion Control

(Continued from page 68)

are completely fertilized. If rills and small gullies are caught in time, they can be prevented from developing into large gullies. Weak spots should be re-treated with seed, fertilizer and straw as they occur, and any damage caused by animals or fire should be repaired as soon as possible.

It is necessary to maintain constant vigilance in order to prevent streams of water from above from running over the slope face. Clogged culverts or broken, clogged or inadequate drainage ditches may allow a concentrated stream of water to pour down over the slope, forming large gullies very rapidly. Under such conditions surface protection of the slope is of no value.

Sloughed material removed from gutters and shoulders should be disposed of in places where it will not cause damage to existing slopes. If such material is dumped on stabilized slopes, the entire stabilization treatment is wasted. It is usually possible to find some gully which needs filling within a reasonable hauling distance.

Since any form of slope stabilization treatment represents a sizable investment, sound economic practice justifies the expenditure of a proportionate amount to protect that investment.

This material was abstracted from the Public Grounds Maintenance Handbook of the Tennessee Valley Authority.

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 New York 17, N. Y.**Water Main**

(Continued from page 65)

36-inch pipe in the East end of the gallery. The picture also shows two Dresser couplings installed for the double purpose of inspection or possible cleaning of the new 36-inch line, and for providing it with desirable flexibility.

The cost of this chamber was approximately \$50,000 complete. The contractor was the R. Zoppo Company of Norwood, Massachusetts, who were the contractors for laying our 36-inch water main extension. The consulting engineers for this water main extension project, including this culvert, were Bogert-Childs Engineering Associates of New York City.

• • •

Rainmaking

(Continued from page 53)

methods. It is a very expensive job to evaluate a project properly, and, therefore, it needs financing by the public through either a state or federal agency. It is understood the Weather Bureau, whose healthy skepticism in the public interest should have been listened to four years ago, has now been authorized to carry out at least one adequate project in the Northwest. This may give us finally, and without exploitation, a reliable indication of the economic value of artificial nucleation. The laboratory tests are convincing, but control and utilization in the field of the tremendously varying forces involved in weather is an entirely different matter. It remains to be proven possible before the public should again pour its money down drains that lead to no proof whatever. Perhaps now that the overselling has run its course we can get somewhere on a more sane and rational level in proper experimentation. The bubble of commercial exploitation was pretty well pricked after 1951, but we have all the more reason to test adequately the theory in the field on a truly scientific and impartial basis. We still have no conclusive proof that it can or cannot work. It is interesting to note that in a Congressional bill, which has already passed the Senate, there is set up a national committee to study artificial nucleation and render a final report within two years on its possibilities. If the committee is selected properly, and is not merely political, then we may get some further convincing proof.

PUBLIC WORKS

EQUIPMENT NEWS

Published Monthly

November, 1953

Baughman Announces 4 New Features in Latest Hydraulic Spreadmobile

Driver Easily Controls Width
and Amount of Spread

JERSEYVILLE, Ill.—The new Baughman Hydraulic Spreadmobile introduces important features for more efficient operation in spreading for ice control. Important is the all-new complete hydraulic operation. The driver can easily and accurately control both the width and the amount of the spread of the skid-proofing material. Two independently operated hydraulic motors perform these functions: one motor drives the drag chain which pulls the material from the back to the front of the body (the speed determines the amount of material to be distributed). The same motor also drives the cross-feed conveyor which carries the material from drag chain to distributor. The second hydraulic motor drives the distributor itself. (Its speed deter-



"Center-Spred" design gives improved spread pattern in all-new Spreadmobile mines the width of the spread—with a range of 1½ ft. to 40 ft.)

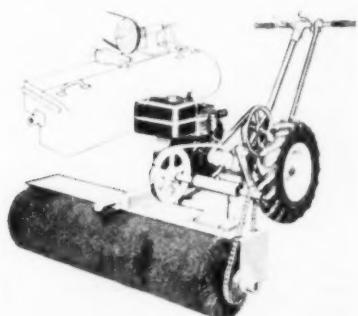
The "Center-Spred" design is another important feature. An improved spread pattern is achieved by locating the distributor between the front and rear wheels, on the driver's side. As a result the material is spread in front of both the front and the rear wheels. In addition to providing better traction, the pattern permits the driver complete visibility and control at all times. By the simple addition of baffles, the spread can be controlled so that it is predominantly to the driver's side or to the curb side.

A patented chamber, running the full length of the body, utilizes the motor exhaust to prevent freezing of the load, also aids the material in penetrating the road ice. Ask for new bulletin containing full details.

Circle No. 11-1 on Readers' Service Card

Small Powered Sweeper Handles Many Municipal Jobs

BALTIMORE, Md.—The Eshelman Co. has introduced for the first



Eshelman motorized sweeper with all-metal hopper, for parking lots, etc.

time a completely motorized power sweeper. Specifically designed to do an effective sweeping job on large pavement and floor areas as in parking lots, factories, parks, industrial plants and the like, this sweeper comes complete with an all-metal hopper that snaps on the front of the brush and has a 100 lb. capacity. The hopper is easily unsnapped for emptying by one person and has a handle on each side for carrying. The special brush used is 10 inches in diameter, 36 inches long and is chain driven. Its low price of only \$299 for both power unit and sweeper makes it an economical, time and work saving machine. Illustrated catalog, yours for the asking.

Circle No. 11-2 on Readers' Service Card

Hydraulic Power Crowd Enables Lessmann Loader To Shovel Frozen Soils

Exerts 15,000 lb. Forward Thrust
When Standing Still

DES MOINES, Ia.—The Lessmann Manufacturing Company has just announced new improvements on all three models of their hydraulic power-crowd loader. This power-crowd exerts a forward thrust of 15,000 pounds while the unit is standing still. This permits shovel loading of even frozen sand and aggregate and digging in unusually hard or compacted soils, according to the manufacturer.

The Lessmann loader will dig 12 inches below wheel level. A variety of buckets, with capacities from $\frac{5}{8}$ to $1\frac{1}{4}$ yards, are interchangeable on the unit by means of four steel pins. Crane hook, lift forks and a dozer blade are also available. The unit will load in the front end of the highest truck when the truck is approached from the rear.

Bendix Hydro-Vac brakes, Vickers power steering and an all-weather cab are optional equipment. Components of this unit-built loader are standardized parts such as Vickers, Bendix, Ford, Timken, etc. This assures availability of parts for quick, low-cost servicing. Write for prices and full details.



New Lessmann loader will dig 12 inches below wheel level, load highest trucks

Circle No. 11-3 on Readers' Service Card

New Galion Side Dump

GALION, Ohio—A new special side dump body, known as the "Galion Side-Dumper", is announced this week by The Galion Allsteel Body Company. According to the manufacturer, this is the first side dump body to employ double lift arm action on a standard dump truck application. Bodies can be made from 8 to 10 feet in length, with capacities of 3 to 6 cubic yards.

The Galion Side Dump body is fine for quarry operations and construction jobs on narrow roads which require gravel, sand, cinder, slag and other building materials to be dumped on the berm. It also has many specialized applications where dumping must be made in



This special Galion side dump body can be built to dump either right or left

limited areas or into troughs or hoppers.

Full details and specifications are available upon request to The Galion Allsteel Body Company, Galion, Ohio.

Circle No. 11-4 on Readers' Service Card

Controls Discharge of Harmful Wastes into Sewer Systems

Many cities require that harmful wastes be "bled" into the sewers at a rate not to exceed a predetermined maximum. When such is the case, the value of an automatic control system is evident.

Builders RCB Controller with a Pendulum Unit, Builders Sightflo Indicators and Builders FCV check valves form a "package control system" that often meets the requirements. As the RCB Controller is readily adaptable for controlling wastes and does not easily clog, it is well suited for this service.

Systems featuring this type of control are already in use. Specific details and a flow diagram are contained in Application Memo No. 600-K2, and we suggest you get a copy now from Builders-Providence, Inc., 345 Harris Ave., Providence, R. I.

Circle No. 11-5 on Readers' Service Card

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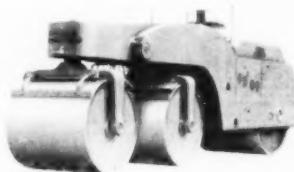
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can pivot above but not below its normal position. When the end guide roll encounters a high spot in the material being rolled, the walking beam rotates and allows the roll to pass over the hump, exerting only normal pressure. This "prepares" the material for high compaction of the center guide roll. As the center guide roll rises on the hump, the "semi-locked" walking beam causes the entire guide end of the roller to rise with the center roll. This lifts the end guide roll off the surface and transfers its weight to the center guide roll, along with some of the weight of the drive roll.

At this instant, the center roll exerts almost three times its normal



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compaction but only after the material has been prepared by the light pass of the first roll.

The walking beam can be used unlocked for rolling vertical curves and warped surfaces. Or it can be used fully locked if conditions warrant. Complete information in new literature just issued.

Circle No. 11-6 on Readers' Service Card

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Circle No. 11-7 on Readers' Service Card

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KANSAS CITY, Mo.—The "Gruvajoint" is a new lightweight coupling for grooved pipe designed and produced by Gustin-Bacon Manufacturing Company of this city. These joints are specifically designed to save time, weight, freight and space in coupling grooved pipe systems where pressures do not exceed 500 pounds per square inch. They are made in 2, 3 and 4-inch sizes and weigh about 40% less than usual. Because Gruvajoints are light and compact, they are easier to handle and store, can be quickly installed in close working areas, and make substantial freight savings possible.

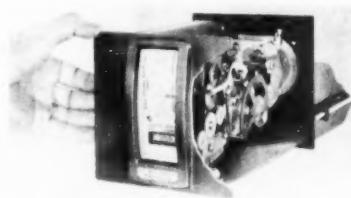
The new couplings automatically absorb expansion and contraction, shock, ground motion and vibration. They remain leakproof under end pulls up to 7500 pounds; permit layout misalignment up to 3°; with-

stand temperatures between 200° F. and minus 65° F. They can be applied or removed in approximately one minute, and used again and again. Write for complete details.

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FEATURES small size, high accuracy for gas or liquid measurement.

motor establishes a timing base for the integrator, its low speed increasing its ruggedness. This instrument may be combined with an impulse-type counter to operate shut-off or other end-point control devices after a certain flow has been measured. Get complete details from Fischer & Porter Co., 15 Jacksonville Road, Hatboro, Pa.

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feeder to maintain a predetermined pH range in the flocculation basin. In controlling the pH, the proper pH zone for the character of the water to be treated is first determined. Set to this point, the pH controller receives continuous measurements from the pH electrodes in the flocculation basin and varies the rate of the lime feeder to keep the pH constant. Ask The Foxboro Company, Foxboro, Mass. for data.

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Public Works Magazine

310 E. 45th St., New York 17, New York



Garbage Body Has Mechanical Compression

CHARLOTTE, N.C.—The Packa-Van garbage collection truck body, offered in 10, 13 and 16-cu. yd. models, features a mechanically operated ram which applies a 35,000 pound force to compress the load and unload contents quickly and positively. The ram is the full size



LOADS, unloads contents quickly

of the rectangular body interior and is inclined upward to lift the contents during compression, thus filling the entire body to capacity. A factory-adjusted electric clutch protects all working parts of the packing mechanism and prevents overload on the truck power takeoff. Packa-Van bodies are easily mounted on 2 or 2 1/2-ton conventional or cab-over-engine truck chassis. Complete data on this unit is available from Brown Truck & Trailer Mfg. Co., Box 1281, Charlotte, N.C.

Use coupon on page 32; circle No. 11-11

New Low-Cost Controls for Outdoor Lighting

SOUTH BRAINTREE, MASS.—A new low cost 575 watt photoelectric control for outdoor lighting has been announced. The new Fisher-Pierce Series 64400 control is a small, compact, lightweight unit readily adapted to almost any mounting requirements. When used to control street lighting, the low initial cost as well as the savings in wiring, other materials and labor, make it economically feasible to use one control per lamp.

These controls provide lighting safety and economy because lights are on when and only when needed, regardless of time of day or weather conditions. Applications, in addition to street lighting control, include automatic control of lighting in parking lots, storage areas, traffic islands, etc. The control also is espe-

cially suited for aircraft obstruction light control on smoke stacks, radio towers, high buildings, bridges and elevated tanks. Ask for complete details.

Use coupon on page 32; circle No. 11-12

New Pipe Threader Adjusts Quickly to 1 or 2-inch Size

This pipe threader for use on power drives is entirely self-contained and can be quickly and easily adjusted to thread 1 to 2-inch pipe using only one set of dies. You can adjust the dies without removing the threader from the machine, a quick opening handle retracting them instantly, without stopping power drive. There is no lead screw to jam or wear out and the threader will fit all standard power drives. Other features include one set of high-speed steel dies and a pre-set 4-jaw centering guide that will cut oversize, undersize and extra long threads. Better get full details now from the Ridge Tool Co., Elyria, Ohio.

Use coupon on page 32; circle No. 11-13

"Pollution" Meeting

The Third Annual Water Symposium will be held at Louisiana State University, Baton Rouge, La., December 14 and 15. More data from Paul C. Koons, Jr., Acting Director, Engineering Experiment Station, LSU, Baton Rouge 3, La.

Large Size Trash Burner Keeps Paper from Blowing

"We made a large size trash burner from concrete reinforcing mesh, 6 ft. wide and with 6-inch mesh" writes W. A. Woodbury, City Manager, Falls Church, Va. Dimensions are 6 ft. diameter and 6 ft. high. The ends are welded with chicken wire 2 ft. high to hold the ashes. It is fine to keep paper from blowing while burning.

Sanitary Engineer Available

Position desired, preferably on Eastern Seaboard, by Sanitary Engineer, MSE, age fifty, twenty-two years experience, environmental sanitation and stream sanitation with Massachusetts Department of Public Health, and three and a half years experience as Director Stream Sanitation Laboratory with Florida State Board of Health. Write to William R. Clary, P. O. Box 16, North Chatham, Massachusetts.

Solving the Trash Headache at Fairs and Expositions

Collecting paper cups, beer cans, pop corn boxes and other similar refuse inherent in having a fair or exposition was solved at the International Petroleum Exposition, held in Tulsa, Okla. Two Gar Wood Load-Packers were used. Because of the compaction of the refuse in the vehicle body, these trucks could "pick up" all day before it was necessary to dump them. Important, also, was the fact that they permitted no odors and prevented loose papers from blowing around.

Manufacturer's Agent Available for New York City Area

A young man wishes to represent manufacturers of pumps, water conditioning equipment, sewage and waste treatment lines, and allied items in the New York area, covering a radius of about 150 miles from New York City. Recently in charge of New York Office for well known company active in the water and waste field desires now to establish his own organization. Graduate sanitary engineer, licensed PE; con-

sulting engineer and state health department background. Widely acquainted with consulting engineers, contractors and public works officials in area. Highly recommended by PUBLIC WORKS. Address Box A Public Works, 310 East 45th St., New York 17, N. Y.

• • • Street Maintenance Superintendent Wanted

A Street Maintenance Superintendent is wanted by Berkeley, Calif. Salary range is \$518 to \$631 per month, depending on qualifications. Six years practical or four years professional experience but no residential requirement. File application by Nov. 27; written test Dec. 5. Personnel Department, City Hall, Berkeley, Calif.

• • • Engineers Needed

Midwest engineering firm needs engineers experienced in highway and bridge design for permanent work on urban expressway projects. Reply giving full experience record, personal history and salary wanted. Write box 11-1, care of this magazine.

WATER SUPERINTENDENTS:

Consider the Advantages of Pollard L-P Gas Burner Furnaces

Burns L-P Gas (commonly known as "Boiled Gas"). Thoroughly tested and proven. Melts approximately 50 lbs. of lead in 9 minutes. Flame can be adjusted to maintain desired temperature. One cylinder of gas will operate unit for many hours. Cylinders are made of armor plate.

Catalog No. 26 on Request.

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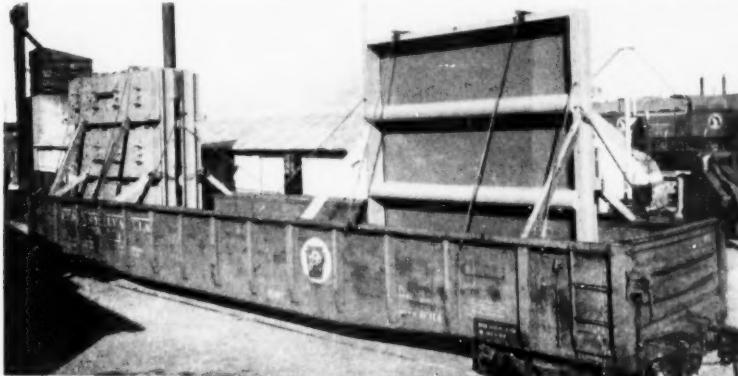
INDEX OF ADVERTISEMENTS

Adams, J. D. Mfg. Co.	29	Jaeger Machine Co.	101
Alabama Pipe Co.	22	Jones, Henry & Williams	125
Albright & Friel, Inc.	124		
Allis-Chalmers Co.	17		
Alvord, Burdick & Howson	124	Kennedy, Clyde C.	125
American-Marietta Co.	47	Knowles, Inc., Morris	125
Amman Photogrammetric Engrs., Jack	112		
Aqua Survey & Instrument Co.	42		
ARPS Corporation	30	Lamar Pipe & Tile Co.	107
Ayer-McCormal Clay Co., Inc.	8	Leese-Neville Co.	93
Baker, Jr., Michael	124	Leopold, F. B.	22
Bannister Engineering Co.	124	Lessman Mfg. Co.	38
Barber-Green Co.	45	Lewis, Harold M.	125
Barco Mfg. Co.	50	Link-Belt Co.	27
Barker & Wheeler	124	Littleford Bros., Inc.	102
Bell, Howard K.	124	Lock Joint Pipe Co.	135
Black & Veatch	124	Lozier & Co., Wm. S.	125
Blackburn Smith Mfg. Co.	99		
Bogert Assoc., Clinton L.	124	M. & H. Valve & Fittings Co.	121
Bowe, Albertson Assoc.	124	Marlow Pumps	113
Bowerston Shale Co.	8	McWane Cast Iron Pipe Co.	100
Brown & Blauvelt	124	Metcalfe & Eddy	125
Brown Engineering Co.	124	Motorola Communications & Electronics, Inc.	95
Brushmaster Saw, Inc.	34	Mueller Co.	13
Buck, Saifert & Jost	124	Murdock Mfg. & Supply Co.	133
Builders Providence, Inc.	108		
Burch Corp.	40	Natco Corp.	8
Burgess & Nipple	124	National Clay Pipe Mfrs., Inc.	23
Burke, Inc., R. H.	124	Natural Rubber Bureau	6
Burns & McDonnell Engr. Co.	124	Nichols Engineering & Research Corp.	98
Butler Mfg. Co.	14		
Caird, James M.	124	Pacific Flush Tank Co.	43
Colgon, Inc.	51	Pacific States Cast Iron Pipe Co.	100
Camp, Dresser & McKee	124	Palmer & Baker, Inc.	125
Capital Engineering Corp.	124	Palmer Filter Equip. Co.	82
Carborundum Co.	10	Paper-Calmenson & Co.	33
Caterpillar Tractor Co.	4, 52, 91, 111	Permutit Company	15
Champion Corp.	82	Phelps Dodge Refining Corp.	96
Chester Engineers	124	Phelps, Inc., Boyd E.	125
Chicago Bridge & Iron Co.	79	Pirnie Engineers, Malcolm	126
Chicago Pump Co.	130	Pitometer Company	126
Classified Ads	25	Pollard Co., Joseph G.	18 & 131
Cleveland Trencher Co.	124	Pomona Terra-Cotta Co.	8
Cole & Sons, Chas. W.	35	Portland Cement Assn.	19
Combustion Engineering, Inc.	124	Preload Engineers, Inc.	126
Consoer Townsend & Assoc.	124	Quinn Wire & Iron Works	100
Cotton, Pierce Streander, Inc.	124		
Darley & Co., W. S.	132	Ranney Method Water Supplies, Inc.	32
DeLeuw, Cather & Co.	124	Reliance Chemical Corp.	129
Dempster Brothers, Inc.	11	Ridge Tool Co.	24 & 115
Detector Co.	129	Ric-wil Co.	116
Dickey Clay Mfg. Co., W. S.	8	Robert & Co.	126
Dresser Industries, Inc.		Roberts Filter Mfg. Co.	133
(See Roots-Connersville Blower Corp.)		Rockwell Co., W. S.	101
Eastern Gunite Co.	18	Roots-Connersville Blower Corp.	97
Equipment Mfg., Inc.	105	Russell & Axon	126
Fairbanks-Morse & Co.	37	Seaman Motors, Inc.	49
Felker Manufacturing Co.	48	Seay Co., Irby	114
Fisher Research Lab., Inc.	100	Shawnee Mfg. Co., Inc.	92
Flexible Pipe Cleaning Co.	122	Sherman Products, Inc.	92
Flexible Sewer-Rod Equipment Co.	34	Sherrill, Miles O.	126
Ford Meter Box Co.	120	Simplex Valve & Meter Co.	46
Foster Co., L. B.	132	Skinner, M. B.	132
Foster Engrg. Co.	41	Smith & Gillespie	126
Foxboro Company	85	Sparkler Mfg. Co.	119
Frink Sno-Plows, Inc.	31	Stanley Engineering Co.	126
Galion Iron Works & Mfg. Co.	2	Stillson Assoc., Alden E.	125
Gannett, Fleming, Corddry & Carpenter, Inc.	124		
General American Transportation Corp.	16	Tarrant Mfg. Co.	99
Gilbert Associates, Inc.	124	Taylor & Co., W. A.	134
Greeley & Hanson	125	Tennessee Corp.	82 & 134
Green Co., Howard R.	125	Texos Vitrified Pipe Co.	8
Greenlee Tool Co.	44	Toledo Pipe Threading Mach. Co.	28
Hamilton Kent Mfg. Co.	100	Trickling Filter Floor Institute	8
Harte Co., John J.	125	Trojan Mfg. Co.	106
Havens & Emerson	125	Turner Brass Works	31
Hauke Mfg. Co.	114		
Hazen & Sawyer	125		
Heil Co.	12		
Highway Equipment Co., Inc.	39		
Hill & Hill	125		
Homestead Valve Mfg. Co.	26		
Hooper, William T.	125		
Hydrauger Corp., Ltd.	106		
Hydraulic Development Corp.	131		
Industrial Materials Co.	8		
International Harvester Co.	9		
Union Metal Mfg. Co.	81		
Universal Concrete Pipe Co.	28		
Wallace & Tiernan Co., Inc.			
Warrick Co., Charles F.			
Water Works Manual			
Watkins, J. Stephen			
Weston Co., L. A.			
White Motor Co.			
Whitman, Requar & Assoc.			
Wolverine Tube Division			
Calumet & Hecla, Inc.			
Wood Co., R. D.			
Woodward Iron Co.			
Worthington Corp.			
		Back cover	
		116	
		118	
		126	
		128	
		89	
		126	
		87	
		123	
		102	
		20 & 21	

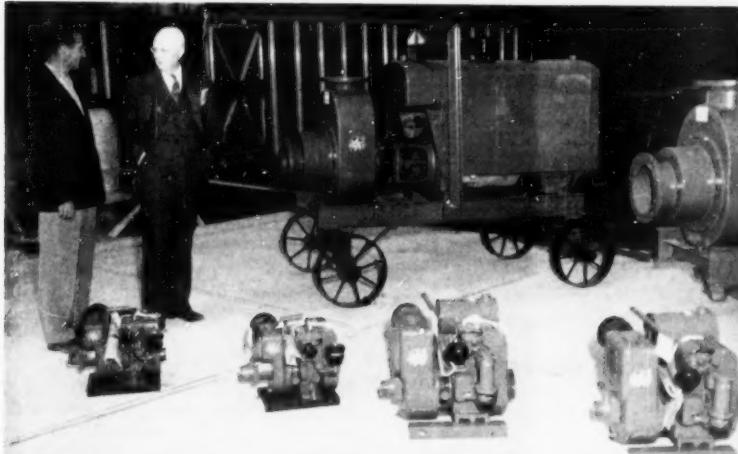
WORTH SEEING



Here is the big drafting room in the new Jack Ammann Photogrammetric Engineers building in San Antonio. They also have branches in Manhasset, Long Island, and Denver. Seven Ammann planes are currently flying on 52 jobs in 27 states.



Three Morse Brothers Machinery Co. (Denver) Pekrul shutter gates shown above are loaded and ready to ride to a huge new flood control and drainage project just back of West Palm Beach, Fla. Believed to be the only gates of this type ever built, their dimensions are 13' by 12' weighing approximately 17,000 lbs. each.



These Marlow pumps "sat for their portrait" at the big Marlow Division of Bell and Gossett open house, at their Ridgewood, N. J., plant in October. Under Marlow's merger with B. & G., A. S. Marlow Jr. becomes general manager of this division and a vice president of Bell and Gossett.

Now's the time to mail this month's Reader's Service card.

YOU PROFIT!

You get *Years of Service* from Murdock Fountains and Hydrants because *Years of Service* are built into them!

100 years' service record simply prove that it "Pays to Buy Murdock!"

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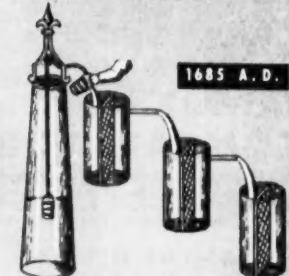


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HYDRANT

the search for PURE WATER



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An imitation of nature's method of passing water through the bowels of the earth was invented by Porzia, an Italian physician. The device settled, strained, and filtered water through sand with both upward and downward flow.

For excellence in MODERN water treatment equipment—gravity and pressure filters—recirculation apparatus...

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WORTH TELLING

by Arthur K. Akers

★ MIAMI FSW HIGHLIGHTS are ours. ("Doc" Symons covers the rest next month). Oftenest to mind now comes Helen and Ralph B. Carter Jr.'s party at their fabulous home on Biscayne Key. From cocktails to Calypso band, scrumptious is the word. . . Then back to Miami by moonlight, with New Jersey's Jessie and Louis Frazza gloriously leading the singing on our bus by people who had (evidently) never sung before!

★ WHEN YOU go to Miami take our word for it and stop at the Biscayne Terrace, the hotel of no regrets.

★ HERE'S BURT POWELL, new advertising manager of Caterpillar Tractor Company. One-time city editor of the PEORIA JOURNAL and president of the Peoria Advertising and Selling Club, he moves up from assistant to former advertising manager W. K. Cox.



Mr. Powell



Mr. Cox

★ BARBER-GREENE COMPANY announces Edward J. Curtin as sales manager of their northeastern sales area, comprising all of New England plus New York and New Jersey.

★ ROY C. KUEHNEMAN is appointed sales manager, Good Roads Machinery Corporation.

★ WOOD MANUFACTURING COMPANY, North Hollywood, Calif., makers of Wood Roadmixers and Preparizers, has been acquired by Pettibone - Mulliken Corporation, Chicago. Operations, personnel, and location remain unchanged at North Hollywood.

★ REX D. CROSS becomes national sales manager of Johnston Pump Company, Pasadena, Calif. He was formerly district sales manager for the southeastern states. C. L. Holbert also moves up, to vice president and general manager.

★ THE ATLAS MINERAL PRODUCTS COMPANY, Mertztown, Pa., has formed its Thermoplastic Structures Division to manufacture a complete line of pipe in sizes up to 6" O.D. and modeled fittings up to 2" O.D. 13 fabrication shops and sales outlets are listed so far.

★ S. MORGAN SMITH COMPANY of York, Pa., announces the merger of its wholly-owned subsidiary, R-S Products Corporation, Philadelphia. All sales, engineering, and administrative functions are moved to York, the first two being combined with the present Valve Division under Carl J. Wilcox, with Russell C. Ayers as his assistant.

★ GERALD E. HAUER is elected vice president, engineering, of the American Well Works, Aurora, Ill.

★ GAR WOOD INDUSTRIES appoints Glenn C. Wilhite, formerly of U. S. Army, retired, as its Wayne Division manager.

★ ELGIN-REFINITE Inc., Elgin, Ill., is the new name of the merged Refinite Sales Company, Omaha, and Elgin Water Softener Company.

★ LINK-BELT SPEEDER, Cedar Rapids, Iowa, names Gordon W. Rowland assistant sales manager.

★ NATURAL RUBBER BUREAU, Washington, expands its staff by adding three traveling technical experts to keep up with a growing demand for information on rubber in roads.

★ SALESMAN: "You make a small down payment and then you don't make any more payments for six months."

PROSPECT (flinching) "Who told you about ME?"

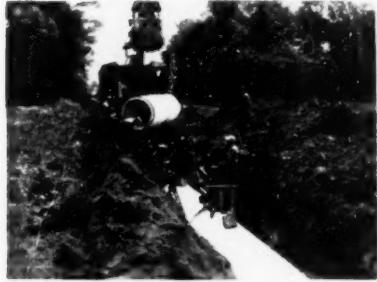
—The Jacuzzi Injector

They all come back for more...

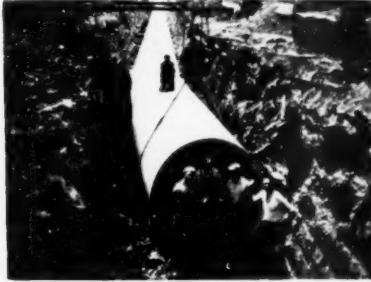
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Laying 72" Lock Joint Reinforced Concrete Cylinder Pipe at Detroit, Mich.



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Laying 66" Lock Joint Reinforced Concrete Pressure Pipe for Tulsa, Okla.



Installation of 90" Lock Joint Reinforced Concrete Pressure Pipe for Denver, Colo.

SCOPE OF SERVICES. Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains 16" in diameter or larger, as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.

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PRESSURE PIPE

pedigree is no accident....

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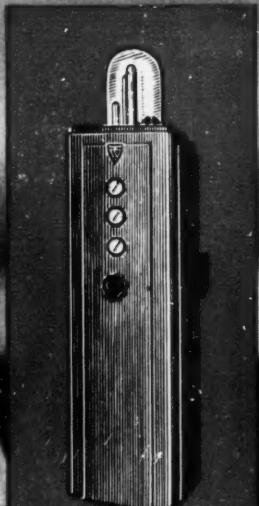
Selection, in the sense of progressive, laboratory-tested improvements in design and construction . . . Improvements which increase the value of dependability "inbred" in W&T Equipment for forty years.

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S-83



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